



56a Leabrooks Road
Somercotes
Derbyshire
DE55 4HB
Tel No: 01773 607483
Fax No: 01773 603331
e-mail: nvc.acoustics@btopenworld.com

**Environmental Noise Assessment
Relating to Proposed
Plastic Recycling and
Processing Facility**

At

**Land off Goat Mill Road
Methyr Tydfil**

for

Sirius Planning

Consultant: D.R. Kettlewell MSc MIOA MAE I.Eng

Ref No.: R21.0304/R1/DRK

Date: 22nd February 2022

Noise & Vibration Consultants Ltd

**Member of Institute of Acoustics
Member of Association of Noise Consultants
Member of Academy of Experts**

**Report prepared by:
D R Kettlewell MSc MIOA MAE I.Eng – Principal Consultant:**

A handwritten signature in black ink, appearing to read 'D R Kettlewell', is written over a light blue horizontal line.

Date: 22nd February 2022

Summary

1. The assessment is being carried out as a result of a proposed Planning Application for the development of a Plastic Recycling and Processing Facility at the Land off Goat Mill Road, Merthyr Tydfil.
2. In order to provide supporting information to the application document submission, Sirius Planning, acting on behalf of Jayplas, has requested a noise impact assessment of the operation of the Proposed Development facility to ensure noise levels meet appropriate guidance and standards for noise.
3. The site is located on land off Goat Mill Road on vacant land on the southern edge of the established Goat Mill Road Industrial Estate and on the eastern edge of Merthyr Tydfil, at a distance of approximately 1.3km from the town centre.
4. Background sound measurements have been undertaken adjacent to the nearest sensitive receptors (NSRs) off over a 24-hour weekday period to establish typical representative background and residual sound levels.
5. The most relevant noise criteria for this type of facility is BS4142:2014+A1:2019 and to achieve a low impact, the 'rating' noise level should not exceed the background sound level or lower.
6. Typical noise levels for the type of plant proposed have enabled us to determine the noise contribution from the proposed site at the nearest residential properties for comparison with representative background sound measurements in accordance with BS4142: 2014+A1:2019.

Existing Noise Climate:

7. The results of the investigations into the existing noise climate have established the following:

Representative background sound levels at NSRs based on the methodology and guidance found in BS4142: 2014+A1:2019 were established. The representative background sound was shown to vary between 48dB to 55dB LA90 during the daytime period (at NSRs). Night-time periods show representative background sound levels to range between 34dB to 42dB LA90.

Conclusions

8. The results of measured baseline data, detailed calculations and consideration of appropriate and relevant noise guidance and standards, we have concluded the following:

- a) Predicted noise levels from the operation of the Proposed Development, HGV and mobile plant movements, and results show that the site rating noise level would not exceed representative background sound levels and therefore likely to result in a **low** impact according to BS4142: 2014+A1:2019.
 - b) The noise contribution level from the Proposed Development during night-time periods would also be between 29dB to 39dB L_{Aeq} , which according to BS8233: 2014, would fall within relevant guidance relating to internal levels within sensitive rooms of residential dwellings (assuming an open window) e.g. 15dB reduction for an open window and a 30dB $L_{Aeq,8hr}$ level inside bedrooms.
 - c) The predicted noise contribution at the nearest residential receptor from the operation of the Proposed Development shows a level ranging between 29dB(A) to 43dB(A) L_{eq} during the daytime and night-time periods are well below typical residual sound levels that would provide good masking of any site attributable noise.
 - d) The results of noise calculations (in accordance with BS5228-1: 2009+A1:2014) of the highest likely noise levels generated during the construction phase of the development shows that during peak noise periods noise levels are unlikely to exceed reasonable threshold levels for short term temporary noise sources at nearest residential receptors. Best practicable means (BPM) would be applied during the construction works to control and minimise noise.
 - e) In terms of construction vibration, with the implementation of BPM, the levels of vibration are expected to be below the level of perceptibility and therefore insignificant.
 - f) Any increase in road traffic noise would be negligible based on the additional vehicle movements generated by the Proposed Development.
9. This assessment concludes that the proposed operation of the Site, with the implementation of appropriate mitigation measures, would generate noise and vibration levels within relevant noise standards and guidelines at nearest sensitive receptors and would therefore **not be significant** or generate any adverse impacts. We therefore conclude that there are no reasons for refusal on ground of noise.

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1.0 INTRODUCTION

- 1.1 At the request of Sirius Planning acting on behalf of Jayplas, Noise & Vibration Consultants Ltd ("NVC") was commissioned to assess the noise impact of the proposed Plastic Recycling and Processing Facility on land off Goat Mill Road, Dowlais, Merthyr Tydfil.
- 1.2 The assessment is being carried out as a result of a proposed Planning Application for the Proposed Development to ensure noise levels meet appropriate guidance and standards.
- 1.3 Background sound measurements have been undertaken adjacent to the nearest sensitive receptors (NSRs) over a 24-hour weekday period to establish typical representative background sound levels. Baseline levels have been measured under Covid 19 restrictions, which would effectively reduce road traffic noise on the local road network compared with typical road noise generation. The background levels are therefore deemed to be robust in terms of assessing the impacts (i.e. with lower background sound levels, the assessment impact would be greater).
- 1.4 Noise levels have been considered and assessed during the operational phase of the proposed development with consideration also afforded to the construction period. Relevant and appropriate noise and vibration guidance and standards have been used to determine the impact and where appropriate amelioration measures provided to mitigate noise or vibration sources to acceptable and reasonable levels.

Sources of Information

- 1.5 Information used in this assessment has been obtained from the following sources:
- Ordnance Survey maps of the local area;
 - Information relating to the general layout of the proposed site was provided by Sirius Planning;
 - BS5228:2009+A1:2014 Parts 1 & 2 'Code of practice for noise and vibration control on construction and open sites';
 - Technical Advice Note (Wales) 11 (TAN11): 1997 'Noise'
 - British Standards BS4142: 2014+A1:2019, BS7445: 2003 & BS8233: 2014;
 - ISO 9613-2: 1996 'Acoustics – Attenuation of Sound During Propagation Outdoors';
 - World Health Organisation (WHO) 'Night Noise Guidelines for Europe': 2009; and
 - Design Manual for Roads & Bridges (DMRB) LA 111 'Noise and Vibration'.

Assessment Methodology

- 1.6 The aim of the survey and assessment was to provide information and advice on the following:
- identify plant equipment and its location;
 - identify the nearest noise sensitive receptors or sites;

- determine likely source noise levels;
 - provide information on existing background sound levels and specific site noise levels at the nearest sensitive receptors;
 - provide predictions of resultant noise and vibration levels at the nearest sensitive receptors during the construction phase; and
 - advise on any appropriate noise mitigation measures to reduce noise for the proposed development by applying Best Practicable Means (BPM).
- 1.7 Where new noise or vibration sources have been identified as being significant or has the potential of causing a significant increase in existing noise levels or exceed relevant vibration levels, we would provide (where practicable) recommendations for noise amelioration using BPM.
- 1.8 Appendix 1 provides details of technical terms within the chapter, for ease of reference. There is also a chart showing typical everyday noise levels to assist in understanding the subjective level of noise in terms of decibels.
- 1.9 The potential noise generated by the above plant is considered in the context of the existing background sound at the site, which is generally influenced by local road traffic noise.

2.0 SITE DESCRIPTION

2.1 Location

- 2.1.1 The site is located on land off Goat Mill Road, Dowlais, Merthyr Tydfil which is on vacant land of the southern edge of the established Goat Mill Road Industrial Estate on the eastern edge of Merthyr Tydfil, at a distance of approximately 1.3km from the town centre.
- 2.1.3 The site area measures approximately 14.6 hectares. The site has been subjected to past historical development, including Dowlais Great White Tip associated with the Dowlais Iron Works.
- 2.1.4 The proposal would comprise two purpose-built industrial buildings totalling circa 22,260 m² which includes 1,000m² of office/administration space over two floors. The buildings would accommodate plant equipment for the processing and recycling of plastic materials.
- 2.1.5 The development includes a Combined Heat & Power (CHP) facility, which would be located between buildings 1 and 2.
- 2.1.6 An external concrete hardstanding would be constructed across the majority of the land developed and would be utilised for the storage of baled plastics.

2.2 Site Access

- 2.2.1 The landform around the development is generally flat, with the site access entrance off Goat Mill Road to the north and the site exit via Goat Mill Road and the A4102 to the south west.

2.3 Operational Information

- 2.3.1 The development is for a plastics recycling facility capable of taking in waste rigid plastics and film from commercial, industrial and public sector over 2 development phases. The project would more than double Wales' plastics reprocessing capacity. The proposed site, when fully operational, will accept and process c. 150,000 tonnes of plastic materials per annum. The facility is designed with the objective of recovering value from materials destined for landfill and thus reducing the amount of waste being disposed by landfill.
- 2.3.2 The proposed plastic recycling and processing facility will consist of two individual warehouse units housing various plant and machinery equipment to enable recycling and processing of different types of plastic to produce close loop products. It is anticipated that the facility will be developed in a series of phases from north to south. The plants will consist of Film sorting, LDPE wash plant, Plastics Recovery Facility, HDPE wash plant and PET Wash Plant.
- 2.3.3 It is anticipated that Phase 1 will develop a rigid Plastics Recovery Facility and Phase 2 will include polymer wash plants consisting of HDPE/PP, PET and LDPE subject to market conditions. The function of the Plastics Recovery Facility is to segregate and feed homogenous plastics into the PET and HDPE/PP wash plants. Other plastic

fractions (e.g. black trays) will be segregated and baled for onward treatment at other Jayplas sites or by a third party. The output of the site will be recycling plastic pallets and flake which are baled and can be sent to other Jayplas sites in England or sold onto the plastics market. The LDPE wash plant washes and granulates material with the end product being a plastic granulate for use in the production of new plastic film products, i.e. Bags for Life.

- 2.3.5 All plant and machinery operations will be undertaken within the buildings.
- 2.3.6 Each building will contain welfare facilities with the first building incorporating an administration office. An external storage area in the form of a large concrete hardstanding area will be provided for incoming plastic materials and processed products. Processed plastic grades will be stored externally in 'bales' prior to onward removal for further processing. Forklift trucks / telehandler to be used in storage yard to load and unload bales.
- 2.3.7 The CHP facility would include a containerised diesel engine with associated inlet and outlet ventilation and exhaust system and a separate dry air cooler radiator and electrical equipment enclosure.

2.4 Operating Hours

- 2.4.1 It is envisaged that the plant and internal operations of the proposed development will operate continuously 24 hours per day and 7 days a week and the external operations, when the facility will generally accept delivery and dispatch of plastics, will operate during day-time working hours, i.e. Monday-Friday 06:00 to 18:00 and Saturday 06:00-13:00.

2.5 Nearest Receptors

- 2.5.1 The nearest residential receptors are located to the west and southwest off Incline Top and Mount View to the south at the following approximate distance from the proposed site buildings:

Receptor Location (refer to Figure 1)	Approx. distance from facility buildings (m)
R1. Incline Top (west of site)	95-160
R2. Incline Top (southwest of site)	200-350
R3. Mount View (south of site)	450-600

- 2.5.2 Figures 1 and 2 attached, shows site position relative to the nearest residential areas and the layout of the site.

3.0 NOISE CRITERIA

3.1 Introduction

- 3.1.1 Noise has been defined as sound that is unwanted by the recipient. The effects of noise on the neighbourhood are varied and complicated, including such things as interference with speech communication, disturbance of work, leisure or sleep. A further complicating factor is that in any one neighbourhood some individuals will be more sensitive to noise than others.

3.2 General Planning Guidance

Technical Advice Note (“TAN”) 11, ‘Noise’ – 1997 ‘Noise’

- 3.2.1 Within the introduction of Technical Advice Note (Wales) 11: 1997 ‘Noise’ it states:
“This note provides advice on how the planning system 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.”
- 3.2.2 Technical Advice Note 11 (“TAN 11”) provides the following information:
- it indicates how noise issues should be handled in development plans and development control;
 - outlines ways of mitigating the adverse impact of noise;
 - provides specific guidance on noisy and noise-sensitive development;
 - introduces the use of noise exposure categories;
 - gives guidance on the use of planning conditions relating to noise.
- 3.2.3 The guidance introduces the concept of Noise Exposure Categories (“NEC”), which have been derived to assist local planning authorities in their consideration of planning applications for residential development near transport-related noise sources. The NEC procedure is only applicable for the introduction of a new residential development into an area with an existing noise source. Annex 1 provides guidance for various types of noise sources, which includes road traffic, aircraft and railways.
- 3.2.4 For reference, the recommended noise exposure categories for new dwellings near existing sources are shown below in Table 18.1. Note that these noise categories are based upon measurements taken in an open site (i.e. without any proposed noise attenuating features in place).
- 3.2.5 The level at the boundary of NEC A and NEC B is based on guidance provided by the World Health Organisation (“WHO”) health criteria from 1980, which states that *“general daytime outdoor noise levels of less than 55dB(A) Leq are desirable to prevent any significant community annoyance”*.
- 3.2.6 The night-time noise level at the boundary of NEC A and NEC B is also based upon the WHO health criteria, stating *“based on limited data available, a level of less than 35dB(A) is recommended to preserve the restorative process of sleep”*.

3.2.7 Table 3.1 provides an interpretation of the NEC categories in terms of granting planning permission.

Table 3.1: NEC Categories

NEC Category	Description	Noise Range LAeq,T dB
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.	<55dB(A) daytime (16hr) <45dB(A) night-time (8hr) Road, rail and mixed sources
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.	55-63dB(A) daytime (16hr) 45-59dB(A) night-time (8hr) Road, rail and mixed sources

Relevant Guidance & Standards – Fixed Industrial Noise

BS 4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

3.2.8 BS 4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' is based on the measurement of background sound using L_{A90} noise measurements, compared to source noise levels measured in L_{Aeq} units. The differential between the two measurements; once any corrections have been applied for source noise tonality, distinct impulses etc. (i.e. the 'rating' level); determines the likelihood of complaints.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- 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.

3.2.9 In terms of establishing the rating level, corrections for the noise character has to be taken into consideration. These include the following factors:

Tonality

For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

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. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

3.2.10 The assessment of noise from the fixed and mobile plant at the nearest residential receptors is considered and our expert opinion is provided below:

- a) In terms of tonality, the plant that is likely to contain this type of characteristic would be mobile plant and 'beeper' type reversing alarms. The mobile plant working on site would be fitted with broadband type 'white noise' reverse alarms. HGVs would travel on a one-way and loop system to avoid the need for reversing alarms. Any air conditioning or extract systems venting to outside would be controlled by suitable attenuators. Taking into account the noise mitigation measures proposed, resultant noise contribution from these noise sources relative to existing residual noise we would not expect tonal noise to be perceptible at the nearest receptor and would not expect tonal penalty correction to be applicable.
- b) In terms of impulsivity characteristics this would generally occur within the new building and would therefore be contained and controlled by the building envelope. Noise from the offloading and loading of processed bales would occur within the hardstanding areas of the site between the hours of 0600 to 1800. Whilst we would not expect this characteristic to be perceptible, to be robust we have allowed for a +3dB penalty during daytime external loading of material onto HGVs.

- c) In terms of intermittency the only likely intermittent activity on site is likely to be HGV movements and mobile plant outside the buildings. Taking into account the predicted noise contribution relative to the residual noise levels we would anticipate that the intermittency is unlikely to be distinctive at nearest sensitive receptors (due to ambient noise levels compared with noise contribution and dominance of local road traffic noise).

3.2.11 In conclusion, for robustness, we would add +3dB to the calculated noise contribution during daytime periods to allow for 'just perceptible' impulsivity.

BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'

3.2.12 The British Standard BS8233 provides additional guidance on noise levels within buildings. These are based on the WHO recommendations and the criteria given in BS8233 for unoccupied spaces within residential properties.

3.2.13 The guidance provided in section 7.7 of BS8233 provides recommended internal ambient noise levels for resting, dining and sleeping within residential dwellings. Table 3.2 provides detail of the levels given in the standard.

Table 3.2: BS8233: 2014 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hours}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hours}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hours}$	30 dB $L_{Aeq,8hours}$
Study and work requiring concentration	Offices	35-45dB $L_{Aeq8hrs}$	-

3.2.14 For a partially open window the standard refers to a reduction of approximately 15dB. This would therefore indicate a noise level outside the window of approximately 50-55dB $L_{Aeq,16hours}$ for living rooms/dining rooms during daytime and 45dB $L_{Aeq,8 hours}$ during night-time outside bedrooms. For offices an external level between the range of 50dB to 60dB $L_{Aeq8hrs}$ would be acceptable assuming an open window and 65dB to 75dB $L_{Aeq8hrs}$ for closed windows with air conditioning.

World Health Organisation (WHO) Guidelines for Community Noise: April 1999

3.2.15 This document provides further updated information on noise and its effects on the community. The document for noise '*In Dwellings*' states "*The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for single sound events. Lower noise levels may be disturbing depending upon the nature of the noise source.*"

3.2.16 The WHO document also states *“To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35dB L_{Aeq} . To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB L_{Aeq} . Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development.”*

3.2.17 In 2009, the WHO published: ‘Night Noise Guidelines for Europe’, which it describes as an extension to the WHO ‘Guidelines for Community Noise’ (1999). It concludes that: *“Considering the scientific evidence on the thresholds of night noise exposure indicated by $L_{night,outside}$ as defined in the Environmental Noise Directive (2002/48/EC), an $L_{night,outside}$ of 40dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. $L_{night,outside}$ value of 55dB is recommended as an interim target for those countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach.”*

3.3 Survey Techniques

3.3.1 The background sound survey has been carried out in accordance with BS4142: 2014+A1:2019 and monitoring conditions in accordance with advice given in BS7445-1:2003 ‘Description and measurement of environmental noise’.

3.4 Representative Background Sound Level

3.4.1 According to BS4142:2014+A1:2019 where the ‘rating’ level does not exceed the measured background sound level the impact would be low. In terms of what is defined as the background sound the standard states the following:

8.1.1 Ensure that the measurement time interval is sufficient to obtain a representative value of the background sound level for the period of interest. This should comprise continuous measurements of normally not less than 15 min intervals, which can be contiguous or disaggregated.

8.1.2 The monitoring duration should reflect the range of background sound levels for the period being assessed. In practice, there is no “single” background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.

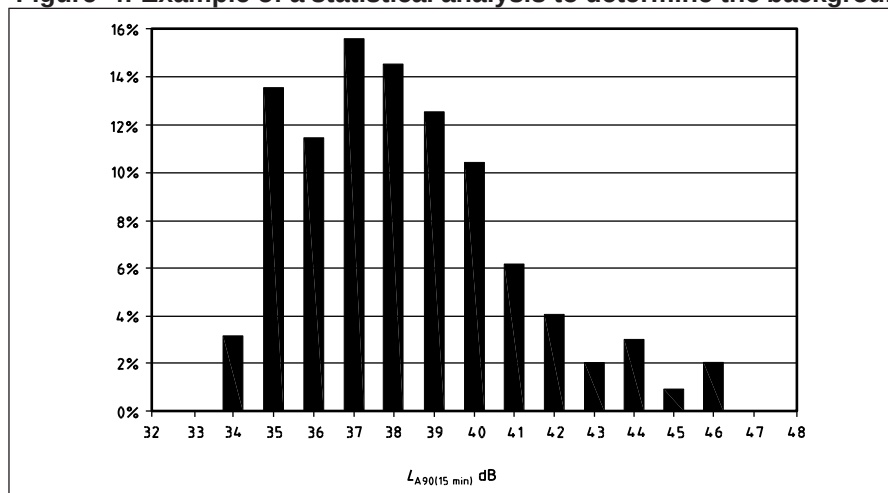
NOTE 1 To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value.

NOTE 2 The mean average of a series of measured background sound levels is not numerically equal to the overall period background sound level that would otherwise be obtained by a single measurement spanning individual measurement periods.

NOTE 3 Background sound can be significantly affected by meteorological conditions, particularly where the main sources of residual sound are remote from the assessment location(s).

NOTE 4 Figure 4 shows an example of a statistical analysis of the results of all the measurement periods in order to determine a background sound level. For this distribution of the data an LA90 (15min) of 37 dB was considered to be representative and in this instance was also the most commonly occurring value.

Figure 4: Example of a statistical analysis to determine the background sound level



- 3.4.2 To establish the background sound level the standard requires the determination of a representative value which is not deemed to be the lowest but under statistical analysis the most common or average (whichever is the lowest) when measured over a representative time period.

3.5 Guidance on Construction Noise

BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites'

- 3.5.1 BS 5228 refers to “the need for the protection against noise and vibration of persons living and working in the vicinity of, and those working on, construction and open sites. It recommends procedures for noise and vibration control in respect of construction operations and aims to assist architects, contractors and site operatives, designers, developers, engineers, local authority environmental health officers and planners.”
- 3.5.2 Part 1 deals with noise in terms of background legislation and gives recommendations for basic methods of noise control relating to construction and open sites where significant noise levels may be generated. The guidance is aimed at giving advice on achieving 'best practice' in controlling noise and vibration from construction and open sites. There is an example of noise limits given in Annex E, which sets out cut-off limits between 65dB(A) and 75dB(A) or 5dB(A) above the ambient noise, whichever is the greater. Part 2 of BS 5228 deals specifically with vibration control and provides the legislative background to the control of vibration

and recommendations for controlling vibration at source and management controls (e.g. liaison with communities, supervision, preparation and choice of plant etc.)

3.6 Relevant Noise Criteria

3.6.1 Standards and guidance that would be appropriate for this type of activity would include the following:

- a) Site operational noise including noise 'break-out' from the new building and on-site HGV movements using BS4142: 2014+A1:2019. Refer to section 4.0 for the assessment of noise criteria relative to established background sound levels.
- b) For construction noise we would refer to BS5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' using the ABC method for a noise threshold of 65dB LAeq_{1hr} for residential receptors.

3.7 Road Traffic Noise

3.7.1 No planning guidance is provided on methods to assess increased traffic noise from existing roads that results from traffic generated by new developments. However, any change in noise levels along affected roads would be relevant to subsequent planning applications. The increase in road traffic noise on the local road network has been assessed using the DMRB LA 111 impact methodology.

4.0 SURVEY METHODOLOGY & RESULTS

4.1 Baseline Sound Survey

- 4.1.1 An environmental sound survey was carried out in the vicinity of nearest residential areas to the site to determine typical baseline levels.
- 4.1.2 The sound monitoring exercise was carried out over a typical weekday period during appropriate weather conditions as defined by BS7445-1: 2003.
- 4.1.3 See attached plan of site (Figure 1) which shows the location of the static noise measurement positions (P1 to P3).

4.2 Instrumentation

- 4.2.1 For sound in the vicinity of nearest sensitive property boundary positions to the site, the following instrumentation was used:

Table 4.1: Detail of Noise Instrumentation

Manufacturer	Description	Type	Serial No.	Calibration Due Date
Norsonic	Real Time Sound Analyser	116	27342	July 2021
Cirrus	Real Time Sound Analyser	171B	G056142	April 2021
Cirrus	Real Time Sound Analyser	1710	G066350	April 2021
Norsonic	Real Time Sound Analyser	118	31992	July 2021
Cirrus	Electronic Calibrator	CR: 513A	031523	April 2021

- 4.2.2 The following set-up parameters were used on the sound level meters during sound measurements:

Time Weighting: Fast
Frequency Weighting: 'A'
Measurement Period: 15 minutes

4.3 Calibration

- 4.3.1 The noise meters were calibrated with the electronic calibrator prior to commencement and on completion of the survey. No significant drift in calibration was observed.

4.4 Survey Dates and Personnel

- 4.4.1 Sound pressure levels were recorded at three fixed positions on land adjacent to NSRs off Incline Top to the west to southwest and Mount View to the south to establish typical background sound data. The survey was set up at site on Thursday 3rd through to Friday 4th December 2020 by Mr D. R. Kettlewell of Noise & Vibration Consultants Ltd.

4.4.2 Measurements of background sound were recorded over 24 hours, at the positions shown on Figure 1. Data logging of L_{Aeq} , L_{A10} , L_{A90} and L_{Amax} were recorded over 15-minute intervals.

4.4.3 Observations at site indicated that the noise climate is dominated by local road traffic noise.

4.5 Meteorological Conditions

4.5.1 Weather conditions were recorded during the period of the survey and are detailed below:

Thursday 3rd December 2020

4.5.2 Dry and fair, light northwest winds (1-3m/s) and variable cloud cover. Temperature 2 to 7degC.

Friday 4th December 2020

4.5.3 Overnight it remained dry, clear skies and light northwest winds (2-3m/s), temperature 2-4degC.

4.5.4 During Friday morning it was dry, clear skies, with light west-north-west winds (1-3m/s), temperature 4-6degC.

4.5.5 The above climatic conditions were suitable for monitoring environmental noise levels in accordance with advice given in BS7445: 2003 'Description and measurement of environmental noise'

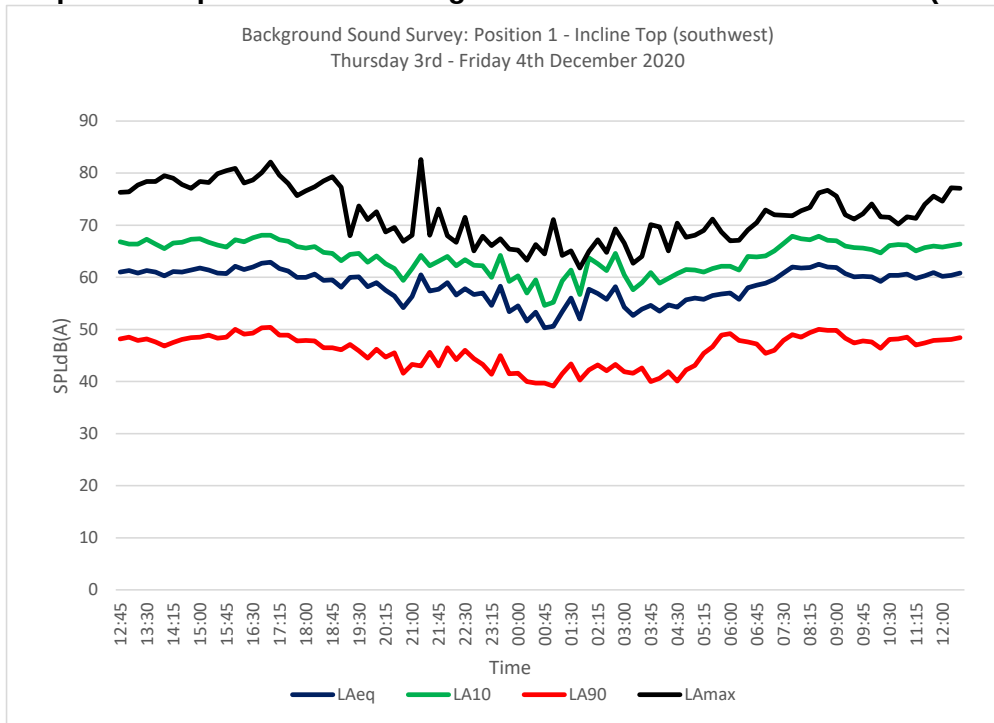
4.6 Noise Survey Results

4.6.1 The results of background sound analysis taken at the fixed monitoring positions is presented below in Table 4.2 and detailed measurements in Appendix 2. Baseline levels have been measured under Covid 19 restrictions, which are likely to have reduced road traffic noise on the local road network, compared with typical road traffic noise generation. The background levels are therefore deemed to be robust in terms of assessing the impacts.

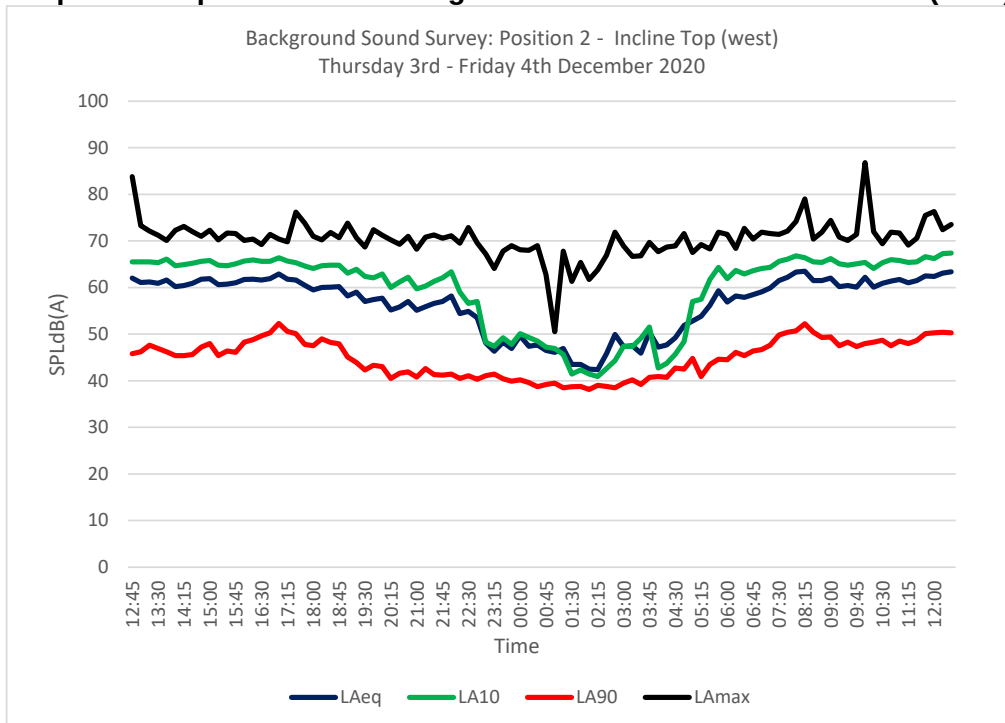
Baseline Levels:

4.6.2 The background sound levels have been analysed for the monitoring period and the most common values or average (whichever is the lowest) determined for establishing the 'representative' background sound level. These are represented below in Graphs 4.1 to 4.3.

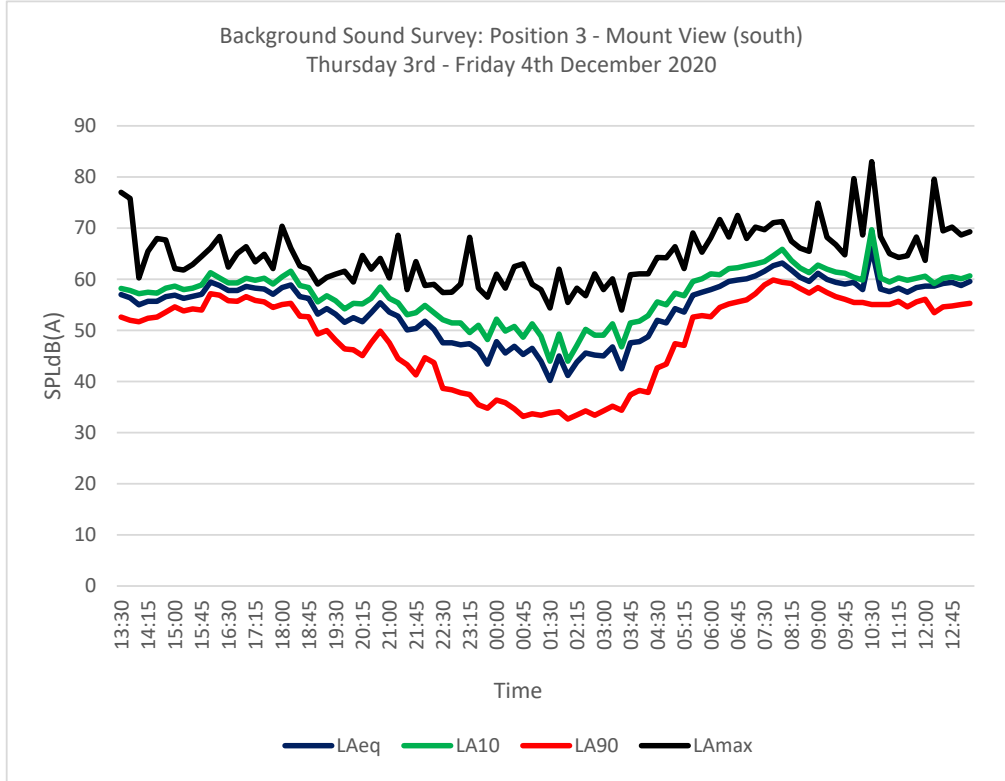
Graph 4.1: Representative Background Sound Levels – Position 1 (southwest)



Graph 4.2: Representative Background Sound Levels – Position 2 (west)



Graph 4.3: Representative Background Sound Levels – Position 3 (south)



4.6.3 The above results show that in accordance with BS4142: 2014+A1:2019 the established representative background sound levels are as follows:

Table 4.2: Representative Background Sound Levels

Time Period	Representative background sound level (Position 1 - southwest) LA90 dB [LAeq dB]	Representative background sound level (Position 2 - west) LA90 dB [LAeq dB]	Representative background sound level (Position 3 - south) LA90 dB [LAeq dB]
Daytime: 0700-2300 hours	48 [60]	48 [61]	55 [58]
Night-time: 2300-0700 hours	39 [52]	42 [55]	34 [49]
Early morning 0600-0700 hours	48 [57]	46 [58]	55 [59]

Established Noise Criteria

4.6.4 In accordance with BS4142:2014+A1:2019 using the above determined representative background sound levels and noise character analysis undertaken, the following criteria would be required at the nearest sensitive receptor to achieve a low impact.

Table 4.3: Noise Limit Criteria for a Low Impact

Time Period	Receptor Position	Representative background sound Level LA90 dB	Noise Limit Rating Level to achieve low impact according to BS4142:2019 LAeq,T dB
Daytime 0700-2300 hours	R1: Southwest	48	<=48dB (1hr)
	R2. West	48	<=48dB (1hr)
	R3: South	55	<= 55dB (1hr)
Night-time 2300-0700 hours	R1: Southwest	42	<=42dB (15mins)
	R2. West	39	<=39dB (15mins)
	R3: South	34	<= 34dB (15mins)
0600-0700 hours	R1: Southwest	48	<=48dB (15mins)
	R2. West	46	<=46dB (15mins)
	R3: South	55	<=55dB (15mins)

5.0 NOISE LEVEL PREDICTIONS

5.1 Introduction

- 5.1.1 Noise has been defined as sound, which is undesired by the recipient. The effects of noise on the neighbourhood are varied and complicated, including such things as interference with speech communication, disturbance of work, leisure or sleep. A further complicating factor is that in any one neighbourhood some individuals will be more sensitive to noise than others.
- 5.1.2 A measure that is in general use and is recommended internationally for the description of environmental noise is the equivalent continuous noise level or L_{Aeq} parameter.
- 5.1.3 In general, the level of noise in the local environs that arises from a development site will depend on a number of factors. The more significant of which are:-
- (a) The sound power levels (SWL's) of the plant or equipment used on site.
 - (b) The periods of operation of the plant on site.
 - (c) The distance between the source noise and the receiving position.
 - (d) The presence or absence of screening effects due to barriers, or ground absorption.
 - (e) Any reflection effects due to the facades of buildings etc.
 - (f) Noise character.

5.2 Prediction Methodology

Construction Noise

- 5.2.1 The prediction method used for the construction phase of the development is based on that outlined in British Standard (BS) 5228:2009+A1:2014 "Code of practice for noise and vibration control on construction and open sites".

Operational Noise

- 5.2.2 For site operational noise we have used ISO9613-2 prediction modelling and CadnaA software for producing noise maps of the highest likely generated noise.
- 5.2.3 The methodology takes into account source position, distance, duration of activity in relation to site activities and the nearest sensitive receptors. The noise modelling assumes that all plant is operating. The prediction calculations therefore provide an indication of the highest likely noise level.
- 5.2.4 Predictions for mobile plant movements on site have also been based on the calculation methodology provided under ISO9613-2 and assuming a 'line source'. We have used CadnaA software prediction modelling for the calculations (refer to Appendix 4 for noise maps). The noise model uses empirical data and reasonable settings to give an accurate prediction of noise from site.

5.3 Plant Noise Levels

5.3.1 A list of plant sound pressure and sound power levels from which the noise predictions were made are presented in Appendix 3.

5.4 Results of Noise Predictions

Site Plant Noise Assessment:

5.4.1 Noise levels from fixed and mobile plant operating at the development site would be assessed against BS4142: 2014+A1:2019. The cumulative effect of all plant operating during the daytime (i.e. HGV movement and loading/offloading outside) is included. For night-time period (i.e. 2300 to 0600 hours) noise 'break-out' from the two recycling and processing buildings and CHP facility is allowed for. Phase 1 would include the most northern building and associated infrastructure and Phase 2 includes both of the recycling and processing buildings and associated infrastructure.

Table 5.1: Predicted Noise Contribution from Site with proposed noise mitigation measures

Receptor Positions (Refer to Figure 1)	Period	Background sound level LA90 (dB) [Residual LAeq dB]	Phase	Rating* noise level LAeq,T (dB)	Level ¹ Difference dB(A)	Increase ² in residual LAeq dB
R1. Incline Top (southwest)	Daytime (0700-2300)	48 [60]	Phase 1 Phase 2	44-46* (1hr) 44-45* (1hr)	-4 to -2 -4 to -3	+0.1 +0.1
R2. Incline Top (west)	Daytime (0700-2300)	48 [61]	Phase 1 Phase 2	43-45* (1hr) 42-43* (1hr)	-5 to -3 -6 to -5	+0.1 +0.1
R3. Mount View (south)	Daytime (0700-2300)	55 [58]	Phase 1 Phase 2	40* (1 hr) 41* (1 hr)	-15 -14	0 0
R1. Incline Top (southwest)	Night-time (2300-0700)	42 [55]	Phase 1 Phase 2	32-34 (15 mins) 33-36 (15 mins)	-10 to -8 -9 to -6	+0.1 +0.1
R2. Incline Top (west)	Night-time (2300-0700)	39 [52]	Phase 1 Phase 2	34-38 (15 mins) 38-39 (15 mins)	-5 to -1 -1 to 0	+0.2 +0.2
R3. Mount View (south)	Night-time (2300-0700)	34 [49]	Phase 1 Phase 2	29 (15 mins) 32 (15 mins)	-5 -2	0 +0.1
R1. Incline Top (west)	Early morning (0600-0700)	48 [57]	Phase 1 Phase 2	44-46* (15 mins) 44-45* (15mins)	-4 to -2 -4 to -3	+0.2 +0.1
R2. Incline Top (southwest)	Early morning (0600-0700)	46 [58]	Phase 1 Phase 2	43-45* (15 mins) 42-43* (15 mins)	-3 to -1 -4 to -3	+0.1 +0.1
R3. Mount View (south)	Early morning (0600-0700)	55 [59]	Phase 1 Phase 2	40* (15 mins) 41* (15 mins)	-15 -14	0 0

*The rating level includes a +3dB penalty for noise character from mobile plant loading. ¹Level difference relates to predicted rating noise or noise contribution in column 5 compared with background sound in column 3.

²Calculated by logarithmically adding levels in column 5 (minus any penalty) to column 3 level in [] and then subtracting column 3 in [].

5.4.2 The above tables show the range of predicted highest likely noise levels from site operation which would occur during the daytime and night-time periods.

- 5.4.3 The results show no exceedance of background sound (which includes a +3dB penalty applied to the rating level during the daytime and early morning period for noise character) based on a representative background level and highest likely site noise contribution according to BS4142: 2014+A1:2019. The conclusion in terms of BS4142 would therefore show a **low** impact magnitude.
- 5.4.4 We have used typical library noise data for the type of plant and HGVs to be used on site to maintain the accuracy of the calculations at the nearest property boundary locations during site operations including loading operations.

5.5 Construction Noise

- 5.5.1 Initial site preparation work is likely to involve the movement of soils and the construction of new buildings and infrastructure. It is considered that piling rigs, excavators, haulage lorries, cranes, dumpers, concrete mixers, diggers and paving machines would all, at some time during the construction programme, be operating on the site. In addition, ancillary equipment such as small generators and compressors may also be operating on occasions during the construction of the proposed new building.

Construction Noise Prediction

- 5.5.2 The actual noise level produced by construction work would vary at the nearest property boundary at any time depending upon a number of factors including the plant location, duration of operation, hours of operation, intervening topography and type of plant being used.
- 5.5.3 Detailed below is an indication of the highest likely noise levels at the nearest receptors based on soil movement, infrastructure work and building construction activities at the closest approach to existing residential areas.
- 5.5.4 The calculations use the methodology provided within BS 5228-1:2009+A1:2014. For this method the sound power level of the noise source is defined and the attenuation is calculated between its location and the selected receiver, taking account of distance, screening due to barriers, ground attenuation and the time that a noise source would be operating.
- 5.5.5 It is difficult to estimate how long the different types of activity would last, but typically in areas close to the site boundary (i.e. noisiest construction period assessed) this is normally completed in weeks rather than months. Given the construction activities involved, especially given the activities already undertaken on site, it is considered that noise issues will be limited.
- 5.5.6 The results of calculations for demolition, soil movement, infrastructure work, general site activities and building construction are shown below in Table 5.2.

Table 5.2: Noise Predictions for Highest Likely Construction Noise

Receptor Positions (Refer to Figure 1)	Distance to receptor (m)	Activity	Noise Level, dB L _{Aeq1hr}	BS5228 Threshold level dB L _{Aeq1hr}
R1. Incline Top (west)	95-350	Piling	48-50	65
	95-350	Soil Movement	45-47	65
	95-350	General site activities	44-46	65
	95-350	Infrastructure	44-50	65
	95-270	Building Construction	47-49	65
R2. Incline Top (southwest)	60-450	Piling	54-60	65
	60-450	Soil Movement	51-57	65
	60-450	General site activities	50-55	65
	60-450	Infrastructure	50-59	65
	60-450	Building Construction	53-59	65
R3. Mount View (south)	450-680	Piling	50-51	65
	200-680	Soil Movement	47-48	65
	200-680	General site activities	45-46	65
	200-680	Infrastructure	45-50	65
	450-680	Building Construction	49-50	65

- 5.5.7 For the development, the highest community noise levels are likely to be created during the piling, construction of infrastructure and buildings. Best practice would be applied in accordance with BS5228: 2009+A1:2014 to minimise noise levels. Refer to section 6.4 for details of mitigation measures.

Construction Vibration

- 5.5.8 For construction phase vibration, the LOAEL and SOAEL for construction vibration is set out in DMRB LA 111 and is provided in Table 5.3 below.

Table 5.3: Construction vibration LOAELs and SOAELs for all receptors

Time period	LOAEL	SOAEL
All time periods	0.3mm/sec PPV	1.0mm PPV

- 5.5.9 The magnitude of impact for construction vibration, shall be determined in accordance with Table 5.4 (as defined in DMRB LA 111).

Table 5.4: Magnitude of Impact for Construction Vibration

Magnitude	Vibration level
Negligible	Below LOAEL Above
Minor	Above or equal to LOAEL and below SOAEL
Moderate	Above or equal to SOAEL and below 10mm/s PPV
Major	Above or equal to 10mm/s PPV

Note: Construction vibration shall constitute a likely significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 1) 10 or more days or nights in any 15 consecutive days or nights; or
- 2) a total number of days exceeding 40 in any 6 consecutive months.

5.5.10 The highest levels of vibration generated by construction plant is likely to include the following:

- Piling rigs;
- Dozers;
- Vibratory rollers and compactors;
- Material offloading onto hard surfaces; and
- Concrete vibratory plant.

BS5228:2009+A1:2014 Part 2: Vibration

5.5.11 Part 2 of the Standard deals with vibration from construction and open sites and provides information on the effects of the levels of vibration, human and structural response, response limits of structures and practical measures to reduce vibration.

5.5.12 Table 5.5 below outlines the highest likely vibration levels that could be experienced during construction at the NSRs.

Table 5.5: Highest Likely Construction Vibration (percussive Piling)

Receptor Positions (Refer to Figure 1)	Approximate Nearest Distance to Receptor (m)	Receptor Sensitivity	Range of highest likely vibration (mm/sec)	Perceptible levels of vibration for residential receptors (mm/sec)	Cosmetic damage Limits (mm/sec)
R1. Incline Top (west)	95	High	0.7	>0.3	>5.0
R2. Incline Top (southwest)	60	High	1.3	>0.3	>5.0
R3. Mount View (south)	450	High	0.1	>0.3	>5.0

5.5.13 The above results show the highest likely vibration (i.e. with percussive piling) levels to be just above perceptible vibration and above SOAEL at the closest receptor and approach to the Phase 2 building. Whilst the level of vibration from piling activities is not significant using the highest likely piling rig further control measures would be considered in accordance with BS5228:2009+A1:2014 to reduce the impact below perceptible levels.

BS5228:2009 Part 2+A1:2014: Vibration

5.5.14 Part 2 of the Standard deals with vibration from construction and open sites and provides information on the effects of the levels of vibration, human and structural response, response limits of structures and practical measures to reduce vibration.

5.5.15 The application of 'best practicable means' to control vibration is set out in section 6.0 such that vibration levels should be below the threshold of perceptibility.

5.6 Noise Predictions

5.6.1 A noise prediction model of the site has been developed based on the information detailed in the report and Appendix 3 based on library data of similar types of plant together with information on manufacturer's cladding panel test data and information concerning the proposed development and layout. The prediction model used includes the use of ISO9613-2 which is a nationally recognised calculation method to provide good accuracy.

5.6.2 Within BS4142: 2014+A1:2019 section 10.3 deals with 'uncertainty in calculation' and states:

"Uncertainty in calculating sound levels can arise from:

- a) uncertainty in any measured sound levels used in the calculations;*
- 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.*

Where the sound power level is used for calculating sound pressure levels, it ought to be representative of the source and the conditions under which the source is expected to operate.

Where possible, use recognized standards to establish the sound power level and the uncertainty (e.g. BS EN ISO 3740 and BS EN ISO 3747). Where it is not possible to use appropriate standards, describe the method of establishing the sound power level, report the uncertainty and state the reasons for using this method.

Use a validated method of calculating sound levels, e.g. ISO 9613-2 or similar. If an alternative calculation method is used, fully describe the method and state the reasons for using this method.

Check the implementation of the calculation method for errors.

For simple cases, e.g. where the level of variability in sound propagation resulting from changes in meteorological conditions is likely to be small, simple calculation methods might be sufficient."

5.6.3 In terms of the prediction calculations undertaken, the following points are noted:

- (i) Baseline survey work has been carried out in vicinity of nearest receptor over a weekday 24-hour period under Covid 19 restrictions, which should present a robust assessment of impacts (i.e. background sound levels likely to be lower than under normal local traffic flow conditions and therefore impacts would potentially be shown to be higher than under typical traffic flow conditions).

- (ii) A recognised standard for calculation has been used with appropriate settings to give an accurate prediction.
 - (iii) Input data for the Proposed Development is based on typical noise levels provided by Technology Providers of similar plant within a reverberant environment.
 - (iv) Detailed layout of the site and building heights has been used to inform the noise model.
- 5.6.4 The only potential variation in predicted noise levels is likely to be as a result of sound propagation resulting from changes in meteorological conditions. This is difficult to predict and in the situation where there is a positive wind vector in the direction of nearest sensitive receptors the actual background noise level could, in any case, be higher than when measured under ideal conditions. We therefore would not consider this to be a significant factor due to the fact that when assessing the site for compliance this would be carried out in suitable meteorological conditions. We therefore conclude that the assessment of site noise is accurate, and uncertainty is minimised.
- 5.6.5 It should also be noted that the prevailing wind direction (i.e. south westerly) would blow from the nearest receptor towards the site therefore the receptor benefiting from upwind directionality attenuation would be to the southwest to northwest, which would assist in reducing noise levels.

5.7 Road Traffic

- 5.7.1 Traffic generated by the Site is expected to be in the order of 5 HGVs over an hour (i.e. circa 10 movements per hour). Access to the application site would be via the entrance to the northern site boundary off Goat Mill Road with egress onto Goat Mill Road along the south western site boundary. This connects to the A4102 and the roundabout junction at the A4060.
- 5.7.2 In view of the location and connection to the industrial estate and subjective observation of local road network baseline flows, we would not expect this level of traffic demand to generate any significant noise increase in road traffic noise.
- 5.7.3 According to the Transport Assessment *“The proposed development is likely to have a modest traffic impact at the site access and egress junctions. Meanwhile, the increase in traffic flows at off-site junctions is considered to be negligible and would unlikely have any discernible adverse impact upon the operation of the local network. It is therefore considered that the development should not be prevented on highway grounds.”*

6.0 MITIGATION MEASURES

6.1 Construction Noise

6.1.1 In consideration of the likely highest levels of construction noise and vibration, the following approach could be adopted (where applicable):

- Restriction of construction hours to non-sensitive times of day would normally form part of the planning consent conditions.
- Community Relations – this is one of the most important aspects of mitigation as providing the residents with clear information about the activities that would be taking place and the length of time that any peak noise levels may occur will assist in allaying people's fears. BS 5228 states *"It is suggested that good relations can be developed by keeping people informed of progress and by treating complaints fairly and expeditiously. The person, company or organisation carrying out the work on site should appoint a responsible person to liaise with the public."*
- Use of broadband type reverse alarms for mobile plant (i.e. avoiding tonal 'beeper' type alarms)
- Consider using a one-way system/turning circles and/or use of a banksman to avoid/reduce the need for reverse alarms.
- Careful choice of plant to minimise noise generation (e.g. hire of fixed plant with acoustic enclosures).
- Ensure all plant is regular maintained and correctly fitted with effective silencers / any relevant acoustic hoods etc.
- Maximise distance between any significant noise source and residential receptor locations.
- Plant switched off when not in use.
- Use of non-percussive vibration techniques e.g. hydraulic piling or continuous flight auger (CFA) piling (if applicable).

6.2 Operational Noise

6.2.1 The control of noise from site has been based on the following control measures which will ensure that site operations achieve reasonable and relevant noise criteria. Further advice on applying management controls based on good practice is provided to minimise noise levels although these are not required to meet reasonable and appropriate noise level criteria:

Noise mitigation measures

- (i) Building 1 roof (southern section) formed by acoustic cladding having a minimum Rw 27dB. Refer to Figure 3.
- (ii) All other new building roof areas, eastern walls of building 1 & 2 and northern wall of Building 1 formed by composite cladding to Rw 24dB or higher.
- (iii) New building 1 and 2 western and southern walls formed by insulated cladding to Rw 38dB or higher.
- (iv) New building 2 northern wall formed by insulated cladding to Rw 38dB or higher.
- (v) Doors to northern and eastern walls formed by electric roller shutter doors having Rw 15dB or higher.

- (vi) Doors to southern walls formed by insulated electric roller shutter doors having Rw 20dB or higher.
- (vii) Mobile plant fitted with broadband type noise reverse alarms (i.e. non-beeper type).
- (viii) Any ventilation openings or vents to atmosphere to be silenced to a level not exceeding 65dB @ 1m $L_{Aeq15mins}$ e.g. using acoustic louvres or attenuators designed to achieve the required reduction.
- (ix) Any external plant to be silenced to a level not exceeding 65dB @ 1m $L_{Aeq15mins}$.
- (x) One way system for HGV movements to and from the site.

CHP Mitigation Measures

- (i) CHP Enclosure/container designed to a noise level not exceeding 65dB $L_{Aeq15mins}$ at 1m which includes any ventilation openings and exhaust system tailpipe.
- (ii) Dry Air Cooler and any electrical enclosure designed to a noise level not exceeding 65dB $L_{Aeq15mins}$ at 1m.
- (iii) All plant designed to eliminate any tonal noise character at nearest receptor.
- (iv) The eastern side of the CHP to be fitted with a 3m high acoustic screen in the approximate location indicated on Figure 3.

Management Control Applying Best Practice

- (xi) Vehicles arriving or exiting site (particularly prior to 0800) should consider the following general management procedures in accordance with the 'quiet deliveries demonstration scheme':
 - Consideration to noise and the neighbours is shown as an approach is made to the site and manoeuvring around the site;
 - The vehicle horn is not to be used to alert the site on arrival or waiting;
 - Engines are switched off when you are not manoeuvring;
 - Radios are switched off and doors not slammed when alighting the cab;
 - Load retaining straps/bars are carefully placed in stowage points, not dropped onto the floor (as applicable);
 - Minimise excessive air braking noise;
 - Switch off engines for prolonged stops, but minimise unnecessary start-ups and engine revving;
 - Always unload or load in the designated delivery/loading area, unless instructed by the site management to do otherwise;
 - Report any circumstances to management where adherence to these instructions cannot be fulfilled.

7.0 CONCLUSIONS

7.1 General

- 7.1.1 Background sound measurements have been undertaken in the vicinity of nearest sensitive receptors (NSRs) over a 24-hour weekday period to establish typical representative background sound levels. Baseline levels have been measured under Covid 19 restrictions, which would effectively reduce road traffic noise on the local road network compared with typical road noise generation. The background levels are therefore deemed to be robust in terms of assessing the impacts.
- 7.1.2 Noise levels have been considered and assessed during the operational phase of the proposed development with consideration also afforded to the construction period. Relevant and appropriate noise and vibration guidance and standards have been used to determine the impact and where appropriate amelioration measures provided to mitigate noise or vibration sources to acceptable and reasonable levels.
- 7.1.3 Calculations have been carried out to determine the highest likely noise contribution at the nearest residential property boundary positions for comparison with ambient and background sound levels.
- 7.1.4 The noise assessment has considered the effect of noise 'break-out' from the new buildings and movement of mobile plant within the external storage areas as shown on the site layout plan (see Figure 2). The assessment has also considered the effect of on-site vehicle movements to and from the site to assess any significant impacts.
- 7.1.5 In order to calculate the likely noise 'break-out' from the proposed new building and external activities we have used empirical data of similar fixed plant and vehicle movements to assess the cumulative site noise generated. The calculations take into account spectral corrections for building attenuation, directivity, distance, area factors and plant operation times.

7.2 Existing Noise Climate

- 7.2.1 Representative background sound levels at NSRs based on the methodology and guidance found in BS4142: 2014+A1:2019 were established. The representative background sound was shown to vary between 48dB to 55dB LA90 during the daytime period (at NSRs). Night-time periods show representative background sound levels to range between 34dB to 42dB LA90.

7.3 Conclusions

- 7.3.1 The results of analysis of measured baseline data, detailed calculations and consideration of appropriate and relevant noise guidance and standards, we have concluded the following:
 - a) Predicted noise levels from the operation of the Proposed Development, HGV and mobile plant movements, and results show that the site rating noise level would not exceed representative background sound levels and therefore likely to result in a **low** impact according to BS4142: 2014+A1:2019.

- b) The noise contribution level from the Proposed Development during night-time periods would also be between 29dB to 39dB L_{Aeq} , which according to BS8233: 2014, would fall within relevant guidance relating to internal levels within sensitive rooms of residential dwellings (assuming an open window) e.g. 15dB reduction for an open window and a 30dB $L_{Aeq,8hr}$ level inside bedrooms.
 - c) The predicted noise contribution at the nearest residential receptor from the operation of the Proposed Development shows a level ranging between 29dB(A) to 43dB(A) L_{eq} during the daytime and night-time periods are well below typical residual sound levels that would provide good masking of any site attributable noise.
 - d) The results of noise calculations (in accordance with BS5228-1: 2009+A1:2014) of the highest likely noise levels generated during the construction phase of the development shows that during peak noise periods noise levels are unlikely to exceed reasonable threshold levels for short term temporary noise sources at nearest residential receptors. Best practicable means (BPM) would be applied during the construction works to control and minimise noise.
 - e) In terms of construction vibration, with the implementation of BPM, the levels of vibration are expected to be below the level of perceptibility and therefore insignificant.
 - f) Any increase in road traffic noise would be negligible based on the additional vehicle movements generated by the Proposed Development.
- 7.3.2 This assessment concludes that the proposed operation of the Site, with the implementation of appropriate mitigation measures, would generate noise and vibration levels within relevant noise standards and guidelines at nearest sensitive receptors and would therefore **not be significant** or generate any adverse impacts. We therefore conclude that there are no reasons for refusal on ground of noise.

REFERENCES

BS4142: 2014+A1:2019 'Method for rating industrial noise affecting mixed residential and industrial areas'

BS8233: 2014 'Sound insulation and Noise Reduction for Buildings – Code of Practice'

Guidelines for Community Noise: World Health Organisation: April 1999

World Health Organisation (WHO) 'Night Noise Guidelines for Europe': 2009

Calculation of Road Traffic Noise (CRTN): 1988

ISO 9613-2: 1996 'Acoustics – Attenuation of Sound During Propagation Outdoors'

BS5228:2009+A1:2014 Parts 1 & 2 'Code of practice for noise and vibration control on construction and open sites'

Technical Advice Note (Wales) 11 (TAN11): 1997 'Noise'

Design Manual for Roads & Bridges (DMRB) LA 111 'Noise and Vibration'.

FIGURES

Figure 1: Site Location & Baseline Sound Monitoring Locations

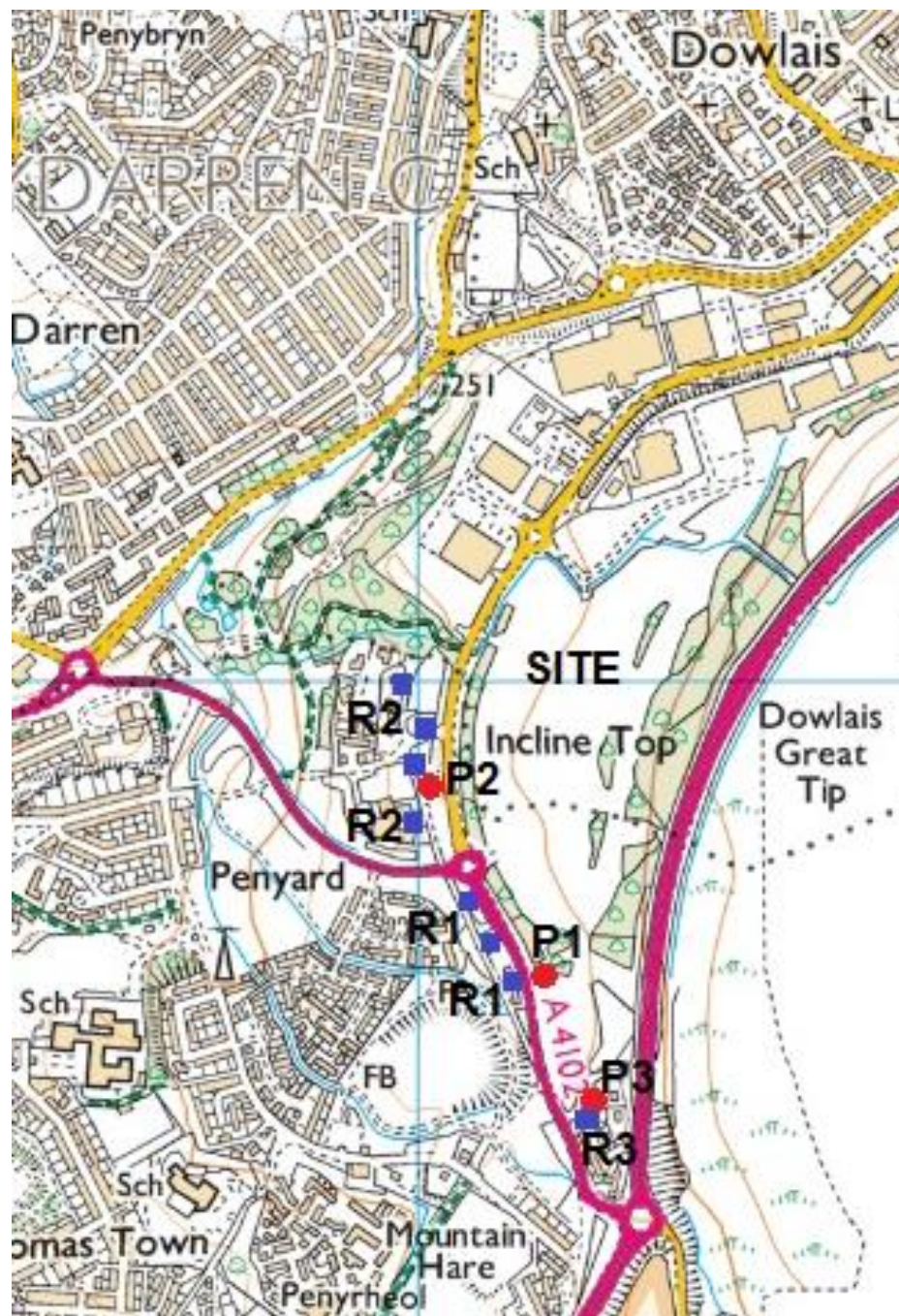


Figure 2: Site Layout

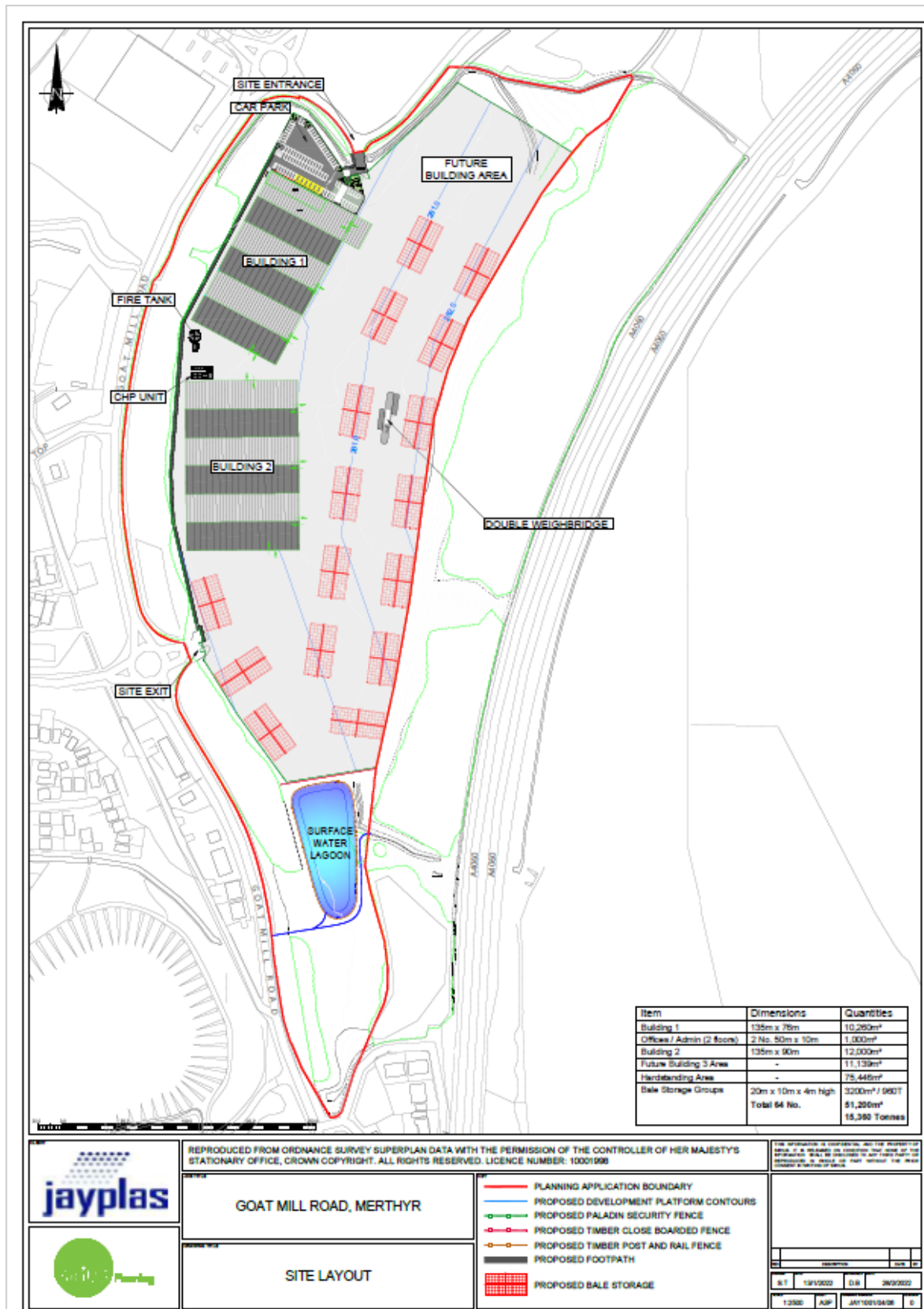
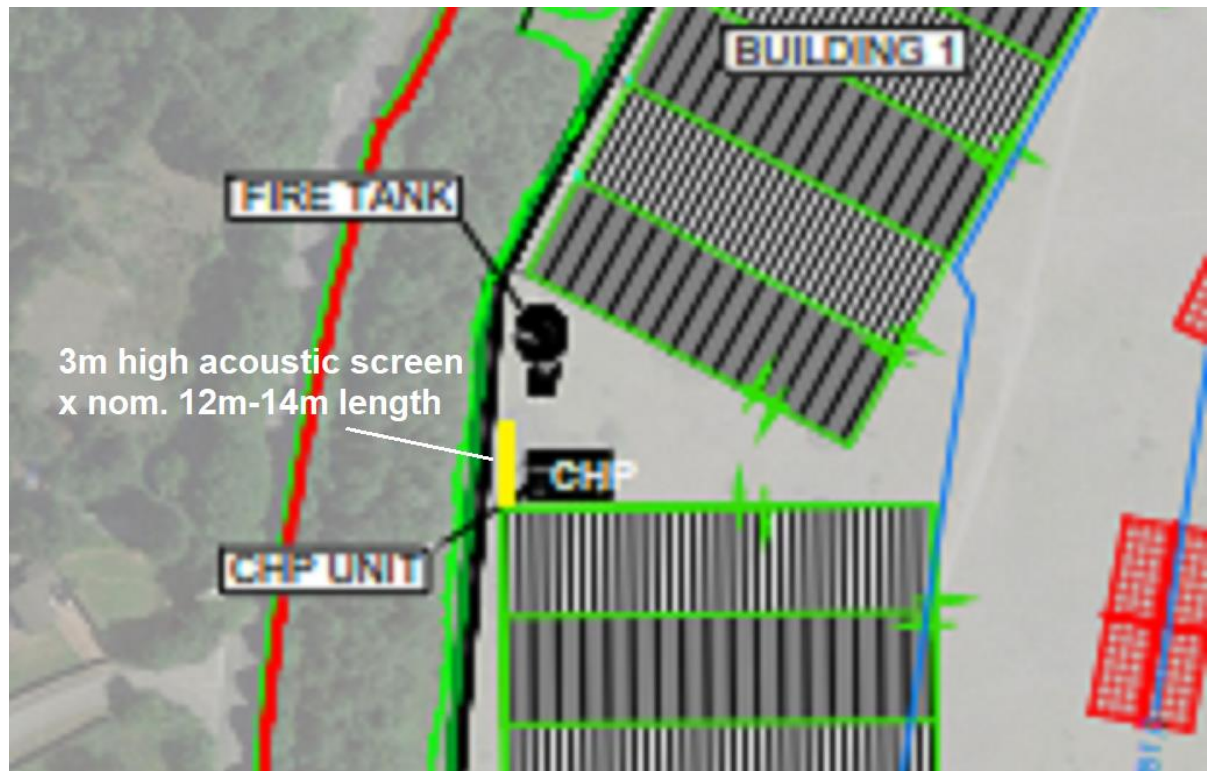


Figure 3: Location of CHP and Screen



Appendix 1

BASIC ACOUSTIC TERMINOLOGY

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air.

Sound Pressure Level is a measurement of the size of these pressure fluctuations. It is expressed in decibels (dB) on a logarithmic scale. Each 3 dB increase in sound pressure level represents a doubling of the sound energy. The threshold of hearing is approximately 0dB.

The rate at which the pressure fluctuations occur determines the pitch or frequency of the sound. The frequency is expressed in Hertz (Hz), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hz to 20,000 Hz. Although sound can be of one discrete frequency - a 'pure tone' - most noises are made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same 'subjective' way. This is the basis of the A-weighted sound level dB(A), normally used to assess the effect of noise on people. The dB(A) weighting emphasises or reduces the importance of certain frequencies within the audible range.

Noise Measurement

The measurement of sound pressure level is only really meaningful where the level of noise is constant. In the typical industrial environment noise levels can vary widely and sometimes short duration high levels of noise are interspersed with periods of relative quiet. The most widely used means of 'averaging' the noise over a period of time is the Equivalent Continuous Sound Level. Normally written as L_{Aeq} this value takes into account both the level of noise and the length of time over which it occurs. There are many meters available which are capable of measuring L_{Aeq} by electronic integration over the measurement period.

The L_{Aeq} or A-weighted equivalent continuous noise level is a measure of the total noise energy over a stated time period and includes all the varying noise levels and re-expresses as an 'average', allowing for the length of time for which each noise level was presented.

The L_{An} parameters are defined as the noise levels which are exceeded for n% of the monitoring period, thus, for example, the L_{A90} parameter is the noise level exceeded for 90% of the 15 minute period, i.e. 13.5 minutes. The L_{A50} parameter is the noise level exceeded for 50% of the hourly period, i.e. 30 minutes, etc. The L_{max} parameter is the maximum RMS A-weighted noise level occurring during the measurement period.

The definition in layman's terms is given below for terminology used in the measurement and results obtained during the survey work.

A-weighting: Normal hearing covers the frequency (pitch) range from about 20Hz to 20,000 Hz but sensitivity of the ear is greatest between about 500Hz and 5000Hz. The "A-weighting" is an electrical circuit built into noise meters to mimic this characteristic of the human ear.

Ambient noise: The totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.

Attenuation: Noise reduction

Background noise: The general quiet periods of ambient noise when the noise source under investigation is not there.

Decibel (dB): The unit of measurement for sound based on a logarithmic scale. 0dB is the threshold of normal hearing; 140dB is the threshold of pain. A change of 1dB is only detectable under controlled laboratory conditions.

dB(A) [decibel A weighted]: Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) serves to distinguish sounds of different frequency (or pitch) in a similar way to how the human ear responds. Measurements in dB(A) broadly agrees with an individual's assessment of loudness. A change of 3dB(A) is the minimum perceptible under normal everyday conditions, and a change of 10dB(A) corresponds roughly to doubling or halving the loudness of sound.

dB(C): [decibel C weighted]: Frequency weighting which does not alter low frequency octave band levels by very much compared to 'A' weighting. Similar to linear reading (i.e. linear does not alter frequency spectra at all)

Frequency (Hz): The number of sound waves to pass a point in one second.

L_{Aeq}: This is a noise index used to describe the "average" level of a noise that varies with time (T). It allows for the different sensitivities of the human ear to different frequencies (pitch), and averages fluctuating noise levels in a manner which correlates well with human perceptions of loudness.

L_{A10,T}: This noise index gives an indication of the upper limit or peak levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 10 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A10} reading was say 60dB, then this means that for 1 hour out of 10 the level went above 60dB.

L_{A90,T}: This noise index gives an indication of the lower limit or levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A90} reading was say 50dB, then this means that for 9 hours out of 10 the level went above 50dB.

L_{Amax}: This is the highest 'A' weighted noise level recorded during a noise measurement period.

Residual noise: The ambient noise remaining at a given position in a given situation when the noise source under investigation is not there.

Specific noise: The noise source under investigation for assessing the likelihood of complaints

Examples of typical noise levels

Source/Activity	Indicative noise level [dB(A)]
Threshold of hearing	0
Rural night-time background	20-40
Quiet bedroom	35
Wind farm at 350m	35-45
Busy road at 5km	35-45
Car at 65km/h at 100m	55
Busy general office	60
Conversation	60
Truck at 50km/h at 100m	65
City Traffic at 5m	75-85
Pneumatic drill at 7m	95
Jet aircraft at 250m	105
Threshold of pain	140

Appendix 2

Background Sound Level Results

Noise Survey Results

Date: Thursday 3rd December 2020
Location: Goat Mill Road, Methyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Proessing Facility
Data: **Baseline Sound Survey: Position 1 - Incline Top (southwest)**
Instrumentation: Cirrus 171B Real Time Analyser (G056142)
Calibration: 94dB

TABLE 1

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmix (dB)	Observations
12:45	15:00	61.0	66.8	48.2	76.3	Dominated by road traffic noise
13:00	15:00	61.3	66.4	48.5	76.4	
13:15	15:00	60.8	66.4	47.9	77.7	
13:30	15:00	61.3	67.3	48.2	78.4	
13:45	15:00	61.0	66.4	47.6	78.4	
14:00	15:00	60.3	65.5	46.8	79.5	
14:15	15:00	61.1	66.6	47.5	79.0	
14:30	15:00	61.0	66.7	48.1	77.8	
14:45	15:00	61.4	67.3	48.4	77.1	
15:00	15:00	61.8	67.4	48.5	78.4	
15:15	15:00	61.4	66.7	48.9	78.2	
15:30	15:00	60.8	66.2	48.3	79.9	
15:45	15:00	60.7	65.8	48.5	80.5	
16:00	15:00	62.1	67.2	50.0	80.9	
16:15	15:00	61.5	66.8	49.1	78.1	
16:30	15:00	62.0	67.6	49.3	78.7	
16:45	15:00	62.7	68.1	50.3	80.1	
17:00	15:00	62.9	68.1	50.4	82.1	
17:15	15:00	61.7	67.2	48.9	79.6	
17:30	15:00	61.2	66.9	48.9	78.0	
17:45	15:00	60.0	65.9	47.8	75.7	
Log Average 1245-1800		61.3	66.8	48.6	76-82	
Average 1245-1800		61.3	66.8	48.6	76-82	

Noise Survey Results

Date: Thursday 3rd December 2020
Location: Goat Mill Road, Methyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Processing Facility
Data: **Baseline Sound Survey: Position 1 - Incline Top (southwest)**
Instrumentation: Cirrus 171B Real Time Analyser (G056142)
Calibration: 94dB

TABLE 2

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmix (dB)	Observations
18:00	15:00	60.0	65.6	47.9	76.6	
18:15	15:00	60.6	65.9	47.8	77.4	
18:30	15:00	59.4	64.8	46.5	78.5	
18:45	15:00	59.5	64.6	46.5	79.3	
19:00	15:00	58.1	63.2	46.1	77.3	
19:15	15:00	60.0	64.4	47.1	68.0	
19:30	15:00	60.1	64.6	45.9	73.7	
19:45	15:00	58.2	62.9	44.5	71.1	
20:00	15:00	59.0	64.1	46.2	72.6	
20:15	15:00	57.5	62.6	44.7	68.7	
20:30	15:00	56.4	61.7	45.5	69.6	
20:45	15:00	54.2	59.4	41.6	66.9	
21:00	15:00	56.3	61.7	43.3	68.1	
21:15	15:00	60.5	64.2	43.0	82.6	
21:30	15:00	57.4	62.2	45.6	68.1	
21:45	15:00	57.7	63.1	43.0	73.1	
22:00	15:00	59.0	64.0	46.5	68.0	
22:15	15:00	56.6	62.2	44.2	66.7	
22:30	15:00	57.8	63.4	46.0	71.5	
22:45	15:00	56.7	62.3	44.4	65.1	
Log Average 1800-2300		58.5	63.5	45.6	65-83	
Average 1800-2300		58.3	63.3	45.3	65-83	

Noise Survey Results

Date: Thursday 3rd - Friday 4th December 2020

Location: Goat Mill Road, Merthyr Tydfil

Client: Sirius

Project: Plastic Material Recycling & Processing Facility

Data: **Baseline Sound Survey: Position 1 - Incline Top (southwest)**

Instrumentation: Cirrus 171B Real Time Analyser (G056142)

Calibration: 94dB

TABLE 3

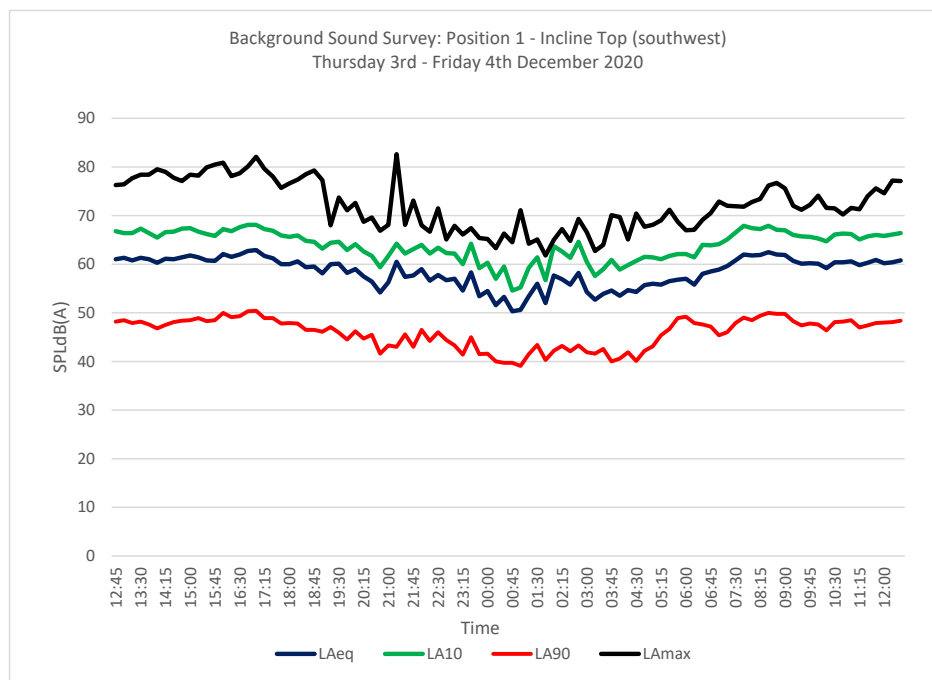
Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmx (dB)	Observations
23:00	15:00	57.0	62.2	43.3	67.9	
23:15	15:00	54.6	60.0	41.4	66.1	
23:30	15:00	58.3	64.2	45.0	67.4	
23:45	15:00	53.4	59.2	41.5	65.4	
00:00	15:00	54.5	60.3	41.6	65.2	
00:15	15:00	51.6	57.0	40.0	63.3	
00:30	15:00	53.3	59.5	39.7	66.3	
00:45	15:00	50.3	54.6	39.7	64.5	
01:00	15:00	50.6	55.2	39.1	71.1	
01:15	15:00	53.4	59.3	41.5	64.2	
01:30	15:00	56.0	61.4	43.4	65.1	
01:45	15:00	52.0	56.7	40.3	61.8	
02:00	15:00	57.7	63.7	42.2	65.0	
02:15	15:00	56.9	62.6	43.2	67.2	
02:30	15:00	55.8	61.3	42.1	64.8	
02:45	15:00	58.2	64.6	43.3	69.3	
03:00	15:00	54.3	60.5	41.9	66.6	
03:15	15:00	52.7	57.6	41.6	62.7	
03:30	15:00	53.9	59.0	42.6	64.0	
03:45	15:00	54.6	60.9	40.0	70.1	
04:00	15:00	53.5	58.9	40.6	69.7	
04:15	15:00	54.7	59.8	41.9	65.1	
04:30	15:00	54.3	60.7	40.1	70.4	
04:45	15:00	55.7	61.5	42.2	67.7	
05:00	15:00	56.0	61.4	43.1	68.1	
05:15	15:00	55.8	61.0	45.4	69.0	
05:30	15:00	56.5	61.7	46.7	71.2	
05:45	15:00	56.8	62.1	48.9	68.7	
06:00	15:00	57.0	62.1	49.2	67.0	
06:15	15:00	55.8	61.4	47.9	67.1	
06:30	15:00	58.0	64.0	47.6	69.1	
06:45	15:00	58.5	63.9	47.2	70.5	
Log Average 2300-0700		55.5	61.1	43.9	62-71	
Average 2300-0700		55.1	60.6	42.9	62-71	
Average 0600-0700		57.4	62.9	48	62-71	

Noise Survey Results

Date: Friday 4th December 2020
Location: Goat Mill Road, Methyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Proessing Facility
Data: **Baseline Sound Survey: Position 1 - Incline Top (southwest)**
Instrumentation: Cirrus 171B Real Time Analyser (G056142)
Calibration: 94dB

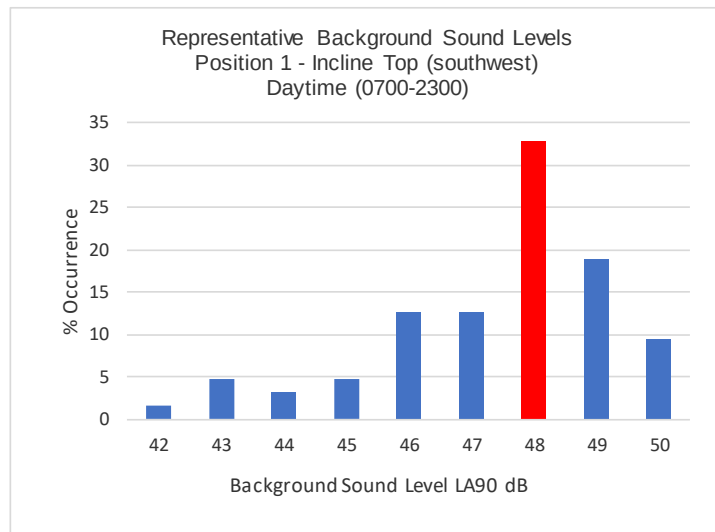
TABLE 4

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmix (dB)	Observations
07:00	15:00	58.9	64.1	45.4	72.9	
07:15	15:00	59.6	65.1	46.0	72.0	
07:30	15:00	60.8	66.5	47.9	71.9	
07:45	15:00	62.0	67.9	49.0	71.8	
08:00	15:00	61.8	67.4	48.5	72.8	
08:15	15:00	61.9	67.2	49.4	73.4	
08:30	15:00	62.5	67.9	50.0	76.2	
08:45	15:00	62.0	67.1	49.8	76.7	
09:00	15:00	61.9	67.0	49.8	75.6	
09:15	15:00	60.7	66.0	48.3	72.0	
09:30	15:00	60.1	65.7	47.4	71.2	
09:45	15:00	60.2	65.6	47.8	72.2	
10:00	15:00	60.1	65.3	47.6	74.1	
10:15	15:00	59.2	64.7	46.4	71.6	
10:30	15:00	60.4	66.1	48.1	71.5	
10:45	15:00	60.4	66.3	48.2	70.2	
11:00	15:00	60.6	66.2	48.5	71.6	
11:15	15:00	59.8	65.1	47.0	71.3	
11:30	15:00	60.3	65.7	47.4	74.0	
11:45	15:00	60.9	66.0	47.9	75.6	
12:00	15:00	60.2	65.8	48.0	74.6	
12:15	15:00	60.4	66.1	48.1	77.2	
12:30	15:00	60.8	66.4	48.4	77.1	
Log Average 0700-1245		60.7	66.2	48.1	70-77	
Average 0700-1245		60.7	66.1	48.0	70-77	
Average 0700-2300		60.4	65.8	47.7	65-83	



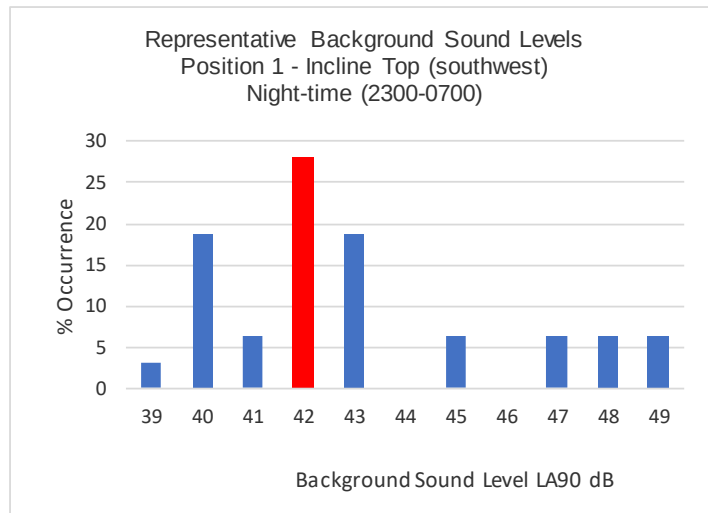
LA90 % Occurrence

42	1.6
43	4.7
44	3.1
45	4.7
46	12.5
47	12.5
48	32.8
49	18.8
50	9.4



LA90 % Occurrence

39	3.1
40	18.8
41	6.3
42	28.1
43	18.8
44	0
45	6.3
46	0
47	6.3
48	6.3
49	6.3



Noise Survey Results

Date: Thursday 3rd December 2020

Location: Goat Mill Road, Merthyr Tydfil

Client: Sirius

Project: Plastic Material Recycling & Processing Facility

Data: **Baseline Sound Survey: Position 2 - Incline Top (west)**

Instrumentation: Cirrus 171A Real Time Analyser (G066350)

Calibration: 94dB

TABLE 5

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmx (dB)	Observations
12:45	15:00	62.0	65.5	45.8	83.8	Domianted by road traffic noise
13:00	15:00	61.1	65.5	46.2	73.3	
13:15	15:00	61.2	65.5	47.6	72.1	
13:30	15:00	60.9	65.3	46.9	71.2	
13:45	15:00	61.6	66.1	46.2	70.1	
14:00	15:00	60.2	64.7	45.4	72.3	
14:15	15:00	60.4	64.9	45.4	73.1	
14:30	15:00	60.9	65.2	45.6	72.0	
14:45	15:00	61.8	65.6	47.2	71.0	
15:00	15:00	61.9	65.8	48.0	72.3	
15:15	15:00	60.6	64.8	45.4	70.2	
15:30	15:00	60.7	64.7	46.4	71.7	
15:45	15:00	61.0	65.1	46.1	71.6	
16:00	15:00	61.7	65.7	48.3	70.1	
16:15	15:00	61.8	65.9	48.8	70.4	
16:30	15:00	61.6	65.6	49.6	69.2	
16:45	15:00	61.9	65.6	50.3	71.4	
17:00	15:00	62.9	66.4	52.3	70.4	
17:15	15:00	61.8	65.7	50.6	69.8	
17:30	15:00	61.6	65.3	50.1	76.2	
17:45	15:00	60.5	64.6	47.8	73.8	
Log Average 1245-1800		61.3	65.4	48.1	69-84	
Average 1245-1800		61.3	65.4	47.6	69-84	

Noise Survey Results

Date: Thursday 3rd December 2020
Location: Goat Mill Road, Merthyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Processing Facility
Data: **Baseline Sound Survey: Position 2 - Incline Top (west)**
Instrumentation: Cirrus 171A Real Time Analyser (G066350)
Calibration: 94dB

TABLE 6

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmix (dB)	Observations
18:00	15:00	59.5	64.1	47.5	71.0	
18:15	15:00	60.0	64.7	49.0	70.2	
18:30	15:00	60.1	64.8	48.2	71.8	
18:45	15:00	60.2	64.8	47.9	70.7	
19:00	15:00	58.2	63.1	45.1	73.8	
19:15	15:00	59.0	63.9	43.9	70.7	
19:30	15:00	57.0	62.4	42.3	68.7	
19:45	15:00	57.4	62.1	43.3	72.4	
20:00	15:00	57.7	62.9	43.0	71.2	
20:15	15:00	55.2	60.0	40.5	70.2	
20:30	15:00	55.8	61.2	41.6	69.3	
20:45	15:00	57.0	62.2	41.9	71.0	
21:00	15:00	55.1	59.7	40.8	68.2	
21:15	15:00	55.9	60.3	42.6	70.8	
21:30	15:00	56.6	61.3	41.3	71.3	
21:45	15:00	57.0	62.1	41.2	70.6	
22:00	15:00	58.2	63.4	41.4	71.1	
22:15	15:00	54.4	59.0	40.5	69.5	
22:30	15:00	54.9	56.6	41.1	72.9	
22:45	15:00	53.5	57.0	40.3	69.6	
Log Average 1800-2300		57.5	62.3	44.1	68-74	
Average 1800-2300		57.1	61.8	43.2	68-74	

Noise Survey Results

Date: Thursday 3rd - Friday 4th December 2020

Location: Goat Mill Road, Methyr Tydfil

Client: Sirius

Project: Plastic Material Recycling & Proessing Facility

Data: **Baseline Sound Survey: Position 2 - Incline Top (west)**

Instrumentation: Cirrus 171A Real Time Analyser (G066350)

Calibration: 94dB

TABLE 7

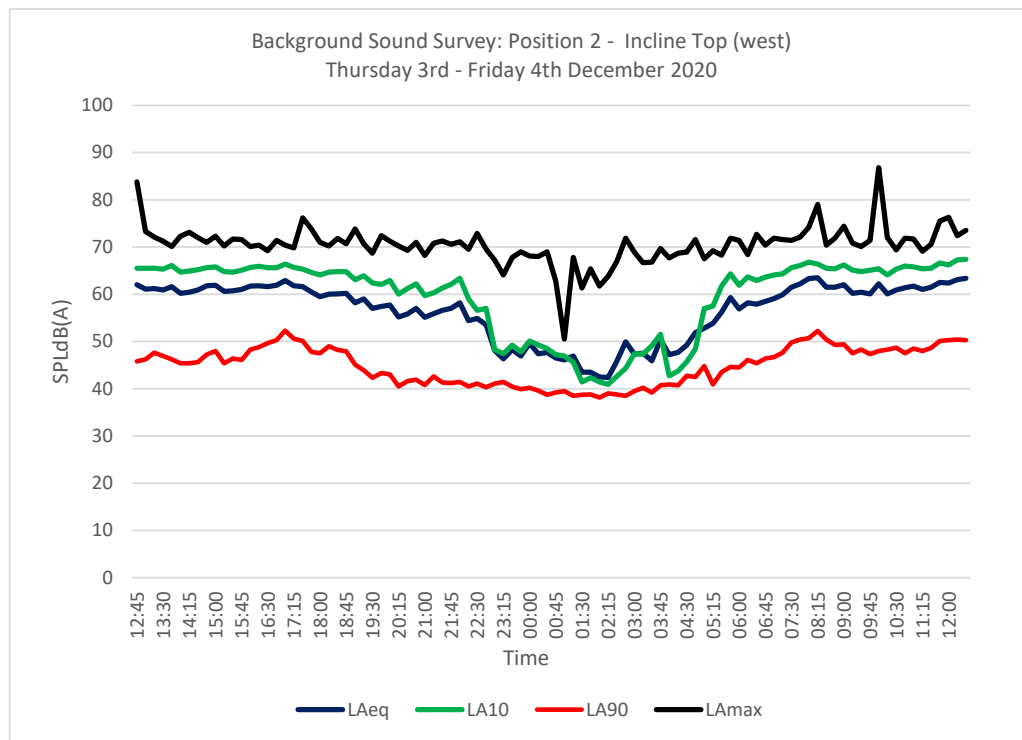
Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmx (dB)	Observations
23:00	15:00	48.1	48.3	41.1	67.2	
23:15	15:00	46.3	47.4	41.4	64.1	
23:30	15:00	48.3	49.2	40.4	67.8	
23:45	15:00	46.9	47.8	39.9	69.0	
00:00	15:00	49.6	50.1	40.2	68.1	
00:15	15:00	47.4	49.3	39.6	68.0	
00:30	15:00	47.7	48.5	38.7	69.0	
00:45	15:00	46.5	47.2	39.2	62.8	
01:00	15:00	46.1	46.9	39.5	50.5	
01:15	15:00	46.9	45.6	38.5	67.8	
01:30	15:00	43.5	41.4	38.7	61.3	
01:45	15:00	43.5	42.3	38.8	65.4	
02:00	15:00	42.5	41.4	38.1	61.7	
02:15	15:00	42.4	40.9	39.0	63.8	
02:30	15:00	45.8	42.6	38.8	66.9	
02:45	15:00	49.9	44.3	38.5	71.9	
03:00	15:00	47.3	47.4	39.5	68.9	
03:15	15:00	47.5	47.3	40.2	66.7	
03:30	15:00	45.9	49.1	39.2	66.8	
03:45	15:00	50.4	51.5	40.7	69.7	
04:00	15:00	47.2	42.7	40.9	67.7	
04:15	15:00	47.7	43.7	40.7	68.7	
04:30	15:00	49.2	45.7	42.7	68.9	
04:45	15:00	51.9	48.4	42.5	71.6	
05:00	15:00	52.8	57.0	44.8	67.5	
05:15	15:00	53.8	57.5	40.9	69.2	
05:30	15:00	56.2	61.7	43.5	68.3	
05:45	15:00	59.3	64.3	44.6	71.9	
06:00	15:00	56.9	61.9	44.5	71.4	
06:15	15:00	58.2	63.7	46.1	68.4	
06:30	15:00	57.9	62.9	45.4	72.7	
06:45	15:00	58.5	63.6	46.4	70.4	
Log Average 2300-0700		52.3	56.5	41.7	51-73	
Average 2300-0700		49.4	50.1	41.0	51-73	
Average 0600-0700		57.9	63	45.6	51-73	

Noise Survey Results

Date: Friday 4th December 2020
Location: Goat Mill Road, Methyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Proessing Facility
Data: **Baseline Sound Survey: Position 2 - Incline Top (west)**
Instrumentation: Cirrus 171A Real Time Analyser (G066350)
Calibration: 94dB

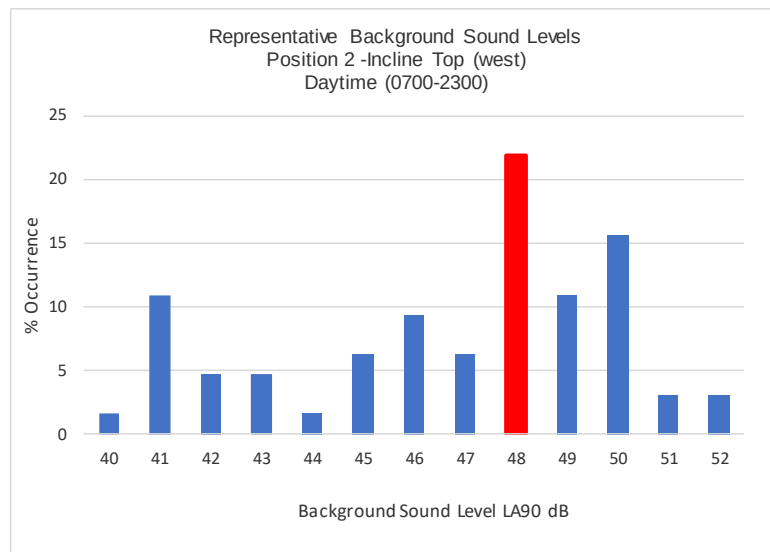
TABLE 8

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmix (dB)	Observations
07:00	15:00	59.1	64.1	46.7	71.9	
07:15	15:00	59.9	64.3	47.6	71.6	
07:30	15:00	61.5	65.6	49.8	71.4	
07:45	15:00	62.2	66.1	50.4	72.1	
08:00	15:00	63.3	66.8	50.7	74.2	
08:15	15:00	63.5	66.4	52.2	79.0	
08:30	15:00	61.5	65.5	50.4	70.4	
08:45	15:00	61.5	65.4	49.3	71.9	
09:00	15:00	62.0	66.2	49.4	74.4	
09:15	15:00	60.2	65.1	47.5	70.8	
09:30	15:00	60.4	64.8	48.3	70.1	
09:45	15:00	60.1	65.1	47.3	71.4	
10:00	15:00	62.2	65.4	48.0	86.8	
10:15	15:00	60.1	64.1	48.3	72.0	
10:30	15:00	60.9	65.3	48.7	69.4	
10:45	15:00	61.4	66.0	47.5	71.9	
11:00	15:00	61.7	65.8	48.5	71.7	
11:15	15:00	61.0	65.4	48.0	69.1	
11:30	15:00	61.5	65.5	48.6	70.6	
11:45	15:00	62.5	66.6	50.1	75.5	
12:00	15:00	62.4	66.2	50.3	76.3	
12:15	15:00	63.1	67.3	50.4	72.4	
12:30	15:00	63.4	67.4	50.3	73.5	
Log Average 0700-1245		61.6	65.7	49.2	69-87	
Average 0700-1245		61.5	65.7	49.1	69-87	
Average 0700-2300		60.6	64.8	47.7	68-87	



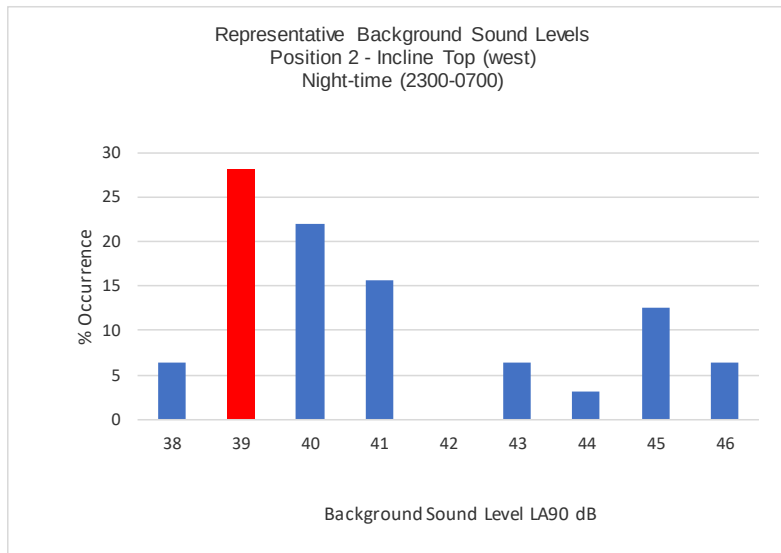
LA90 % Occurrence

40	1.6
41	10.9
42	4.7
43	4.7
44	1.6
45	6.3
46	9.4
47	6.3
48	21.9
49	10.9
50	15.6
51	3.1
52	3.1



LA90 % Occurrence

38	6.3
39	28.1
40	21.9
41	15.6
42	0
43	6.3
44	3.1
45	12.5
46	6.3



Noise Survey Results

Date: Thursday 3rd December 2020
Location: Goat Mill Road, Methyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Proessing Facility
Data: **Baseline Sound Survey: Position 3 - Mount View (south)**
Instrumentation: Norsonic 116 Real Time Analyser (27342)
Calibration: 94dB

TABLE 9

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmix (dB)	Observations
13:30	15:00	57.0	58.2	52.6	77.0	Dominated by road traffic noise
13:45	15:00	56.4	57.8	52.0	75.8	
14:00	15:00	55.0	57.2	51.7	60.3	
14:15	15:00	55.7	57.5	52.4	65.5	
14:30	15:00	55.7	57.3	52.6	68.0	
14:45	15:00	56.6	58.3	53.6	67.7	
15:00	15:00	56.9	58.7	54.6	62.1	
15:15	15:00	56.3	58.0	53.8	61.8	
15:30	15:00	56.7	58.3	54.2	62.9	
15:45	15:00	57.1	58.9	54.0	64.5	
16:00	15:00	59.5	61.3	57.2	66.1	
16:15	15:00	58.8	60.3	56.9	68.4	
16:30	15:00	57.8	59.3	55.8	62.4	
16:45	15:00	57.8	59.3	55.7	65.1	
17:00	15:00	58.6	60.2	56.6	66.4	
17:15	15:00	58.3	59.8	55.9	63.4	
17:30	15:00	58.1	60.2	55.6	64.9	
17:45	15:00	57.1	59.1	54.5	62.1	
Log Average 1330-1800		57.3	59.0	54.7	60-77	
Average 1330-1800		57.2	58.9	54.4	60-77	

Noise Survey Results

Date: Thursday 3rd December 2020
Location: Goat Mill Road, Merthyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Processing Facility
Data: **Baseline Sound Survey: Position 3 - Mount View (south)**
Instrumentation: Norsonic 116 Real Time Analyser (27342)
Calibration: 94dB

TABLE 10

Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmx (dB)	Observations
18:00	15:00	58.4	60.5	55.1	70.4	
18:15	15:00	58.9	61.6	55.3	66.1	
18:30	15:00	56.6	58.8	52.8	62.6	
18:45	15:00	56.3	58.4	52.7	62.0	
19:00	15:00	53.2	55.6	49.3	59.1	
19:15	15:00	54.3	56.8	50.0	60.4	
19:30	15:00	53.2	55.8	48.1	61.0	
19:45	15:00	51.6	54.2	46.4	61.6	
20:00	15:00	52.5	55.3	46.2	59.5	
20:15	15:00	51.7	55.2	45.1	64.7	
20:30	15:00	53.5	56.3	47.6	62.0	
20:45	15:00	55.4	58.5	49.9	64.1	
21:00	15:00	53.6	56.3	47.6	60.3	
21:15	15:00	52.8	55.4	44.5	68.6	
21:30	15:00	50.1	53.1	43.3	58.0	
21:45	15:00	50.4	53.5	41.3	63.5	
22:00	15:00	51.8	54.9	44.7	58.8	
22:15	15:00	50.2	53.5	43.7	59.0	
22:30	15:00	47.6	52.1	38.7	57.4	
22:45	15:00	47.6	51.5	38.4	57.5	
Log Average 1800-2300		54.0	56.6	49.4	57-70	
Average 1800-2300		53.0	55.9	47.0	57-70	

Noise Survey Results

Date: Thursday 3rd - Friday 4th December 2020

Location: Goat Mill Road, Merthyr Tydfil

Client: Sirius

Project: Plastic Material Recycling & Processing Facility

Data: **Baseline Sound Survey: Position 3 - Mount View (south)**

Instrumentation: Norsonic 116 Real Time Analyser (27342)

Calibration: 94dB

TABLE 11

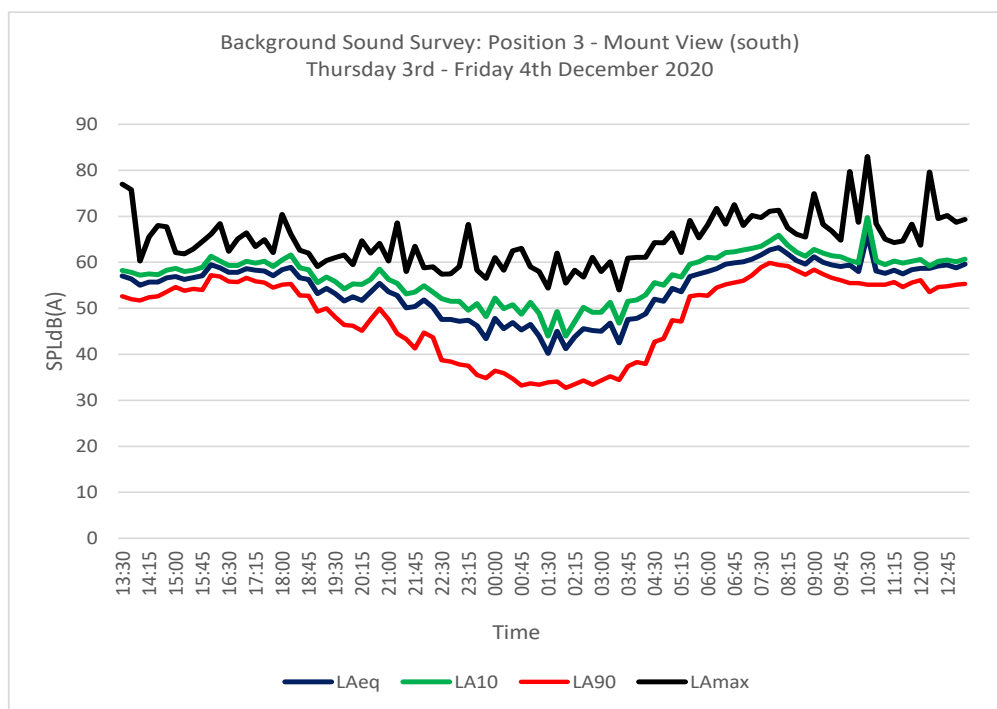
Start Time	Run Time (mins.)	LAeq (dB)	LA10 (dB)	LA90 (dB)	LAmx (dB)	Observations
23:00	15:00	47.2	51.5	37.8	59.1	
23:15	15:00	47.4	49.6	37.5	68.2	
23:30	15:00	46.2	51.0	35.5	58.3	
23:45	15:00	43.4	48.2	34.8	56.5	
00:00	15:00	47.8	52.2	36.4	61.0	
00:15	15:00	45.6	49.9	35.9	58.3	
00:30	15:00	46.9	50.8	34.7	62.5	
00:45	15:00	45.3	48.7	33.2	63.0	
01:00	15:00	46.5	51.3	33.7	59.0	
01:15	15:00	44.0	48.9	33.4	58.0	
01:30	15:00	40.2	44.0	33.9	54.4	
01:45	15:00	45.0	49.3	34.1	62.0	
02:00	15:00	41.2	44.0	32.7	55.5	
02:15	15:00	43.8	47.1	33.5	58.3	
02:30	15:00	45.6	50.2	34.3	56.8	
02:45	15:00	45.2	49.1	33.4	61.1	
03:00	15:00	45.0	49.1	34.3	58.0	
03:15	15:00	46.8	51.3	35.2	60.1	
03:30	15:00	42.5	46.8	34.4	54.0	
03:45	15:00	47.6	51.5	37.4	60.9	
04:00	15:00	47.8	51.8	38.3	61.1	
04:15	15:00	48.8	52.9	37.9	61.1	
04:30	15:00	52.0	55.6	42.7	64.3	
04:45	15:00	51.5	55.0	43.4	64.2	
05:00	15:00	54.3	57.3	47.4	66.4	
05:15	15:00	53.6	56.8	47.1	62.1	
05:30	15:00	56.9	59.6	52.6	69.1	
05:45	15:00	57.5	60.1	52.9	65.3	
06:00	15:00	58.0	61.1	52.7	68.1	
06:15	15:00	58.6	60.9	54.5	71.7	
06:30	15:00	59.6	62.1	55.2	68.3	
06:45	15:00	59.9	62.3	55.6	72.5	
Log Average 2300-0700		52.6	55.6	47.4	59-73	
Average 2300-0700		48.8	52.5	39.9	59-73	
Average 0600-0700		59	61.6	54.6	51-73	

Noise Survey Results

Date: Friday 4th December 2020
Location: Goat Mill Road, Merthyr Tydfil
Client: Sirius
Project: Plastic Material Recycling & Processing Facility
Data: **Baseline Sound Survey: Position 3 - Mount View (south)**
Instrumentation: Norsonic 116 Real Time Analyser (27342)
Calibration: 94dB

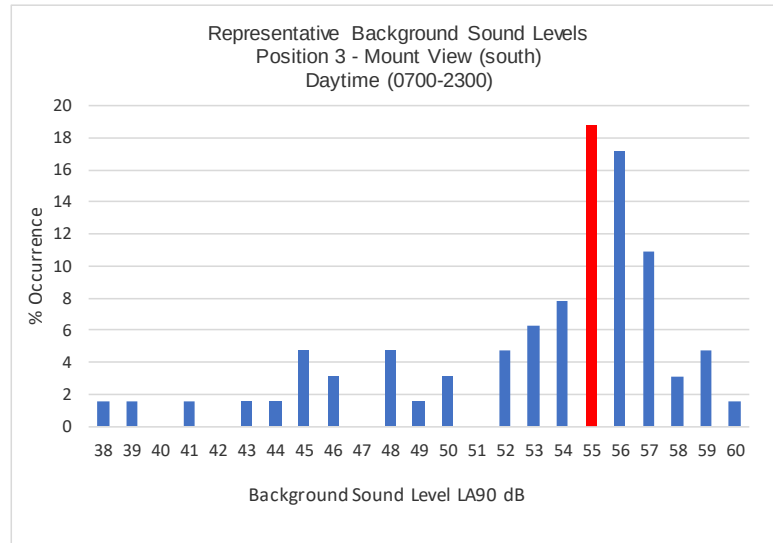
TABLE 12

Start Time	Run Time (mins.)	L _{Aeq} (dB)	L _{A10} (dB)	L _{A90} (dB)	L _{Amax} (dB)	Observations
07:00	15:00	60.1	62.7	56.0	68.0	
07:15	15:00	60.7	63.0	57.2	70.2	
07:30	15:00	61.6	63.5	58.9	69.7	
07:45	15:00	62.7	64.6	59.9	71.1	
08:00	15:00	63.2	65.9	59.4	71.3	
08:15	15:00	61.8	63.7	59.2	67.5	
08:30	15:00	60.4	62.2	58.2	66.1	
08:45	15:00	59.6	61.3	57.3	65.5	
09:00	15:00	61.2	62.8	58.4	74.9	
09:15	15:00	60.0	62.0	57.4	68.2	
09:30	15:00	59.4	61.4	56.6	66.8	
09:45	15:00	59.1	61.2	56.1	64.8	
10:00	15:00	59.4	60.4	55.5	79.7	
10:15	15:00	58.0	59.9	55.5	68.7	
10:30	15:00	66.1	69.7	55.1	83.0	
10:45	15:00	58.1	60.3	55.1	68.4	
11:00	15:00	57.6	59.5	55.1	65.0	
11:15	15:00	58.3	60.3	55.7	64.3	
11:30	15:00	57.5	59.8	54.6	64.6	
11:45	15:00	58.4	60.2	55.6	68.3	
12:00	15:00	58.7	60.6	56.1	63.7	
12:15	15:00	58.7	59.2	53.5	79.6	
12:30	15:00	59.2	60.2	54.6	69.5	
12:45	15:00	59.4	60.5	54.8	70.2	
13:00	15:00	58.8	60.1	55.1	68.7	
13:15	15:00	59.6	60.7	55.3	69.3	
Log Average 0700-1330		60.4	62.5	56.7	64-83	
Average 0700-1330		59.9	61.8	56.4	64-83	
Average 0700-2300		58.1	60.5	55.0	57-83	



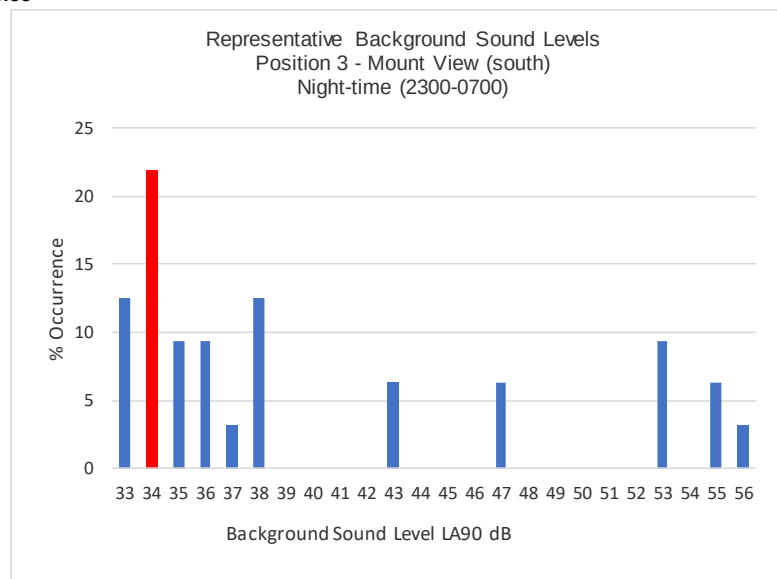
LA90 % Occurrence

38	1.6
39	1.6
40	0
41	1.6
42	0
43	1.6
44	1.6
45	4.7
46	3.1
47	0
48	4.7
49	1.6
50	3.1
51	0
52	4.7
53	6.3
54	7.8
55	18.8
56	17.2
57	10.9
58	3.1
59	4.7
60	1.6



LA90 % Occurrence

33	12.5
34	21.9
35	9.4
36	9.4
37	3.1
38	12.5
39	0
40	0
41	0
42	0
43	6.3
44	0
45	0
46	0
47	6.3
48	0
49	0
50	0
51	0
52	0
53	9.4
54	0
55	6.3
56	3.1



Appendix 3

Assumed Site Operational Noise Levels

Activity	Reverberant Sound Pressure Level LAeq dB	Sound Power Level dB(A)
Recycling Activities	80-85	-
Processing Activities	85-90	-
HGV	-	103
Forklift	-	101
Telehandler	-	103

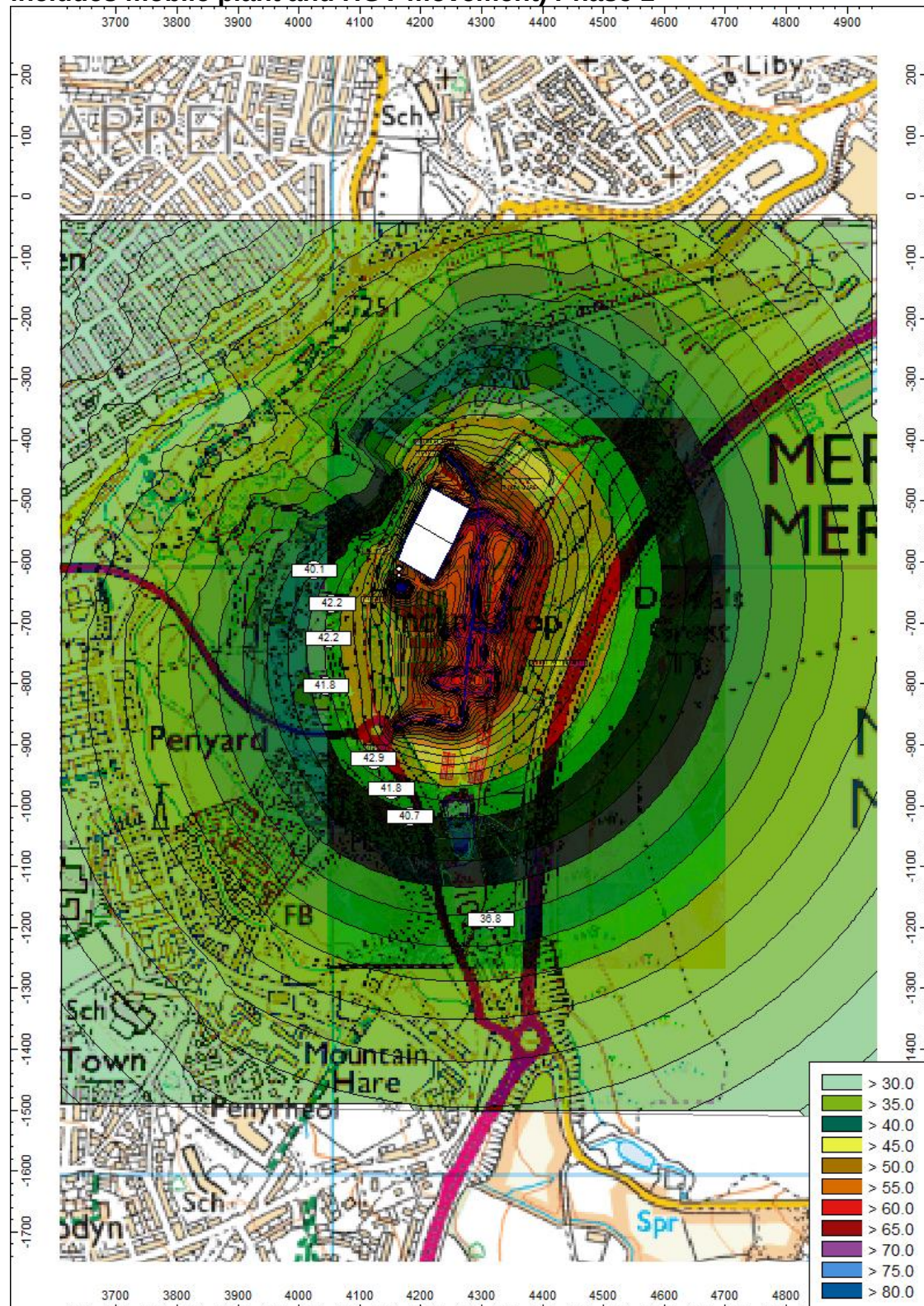
CHP Facility

Plant	Sound Pressure Level at 1m LAeq _{15mins} dB
Gas Engine Enclosure/Container	65
Exhaust Tailpipe	65
DAC	65
Electrical enclosure	65
Tonal noise character	None

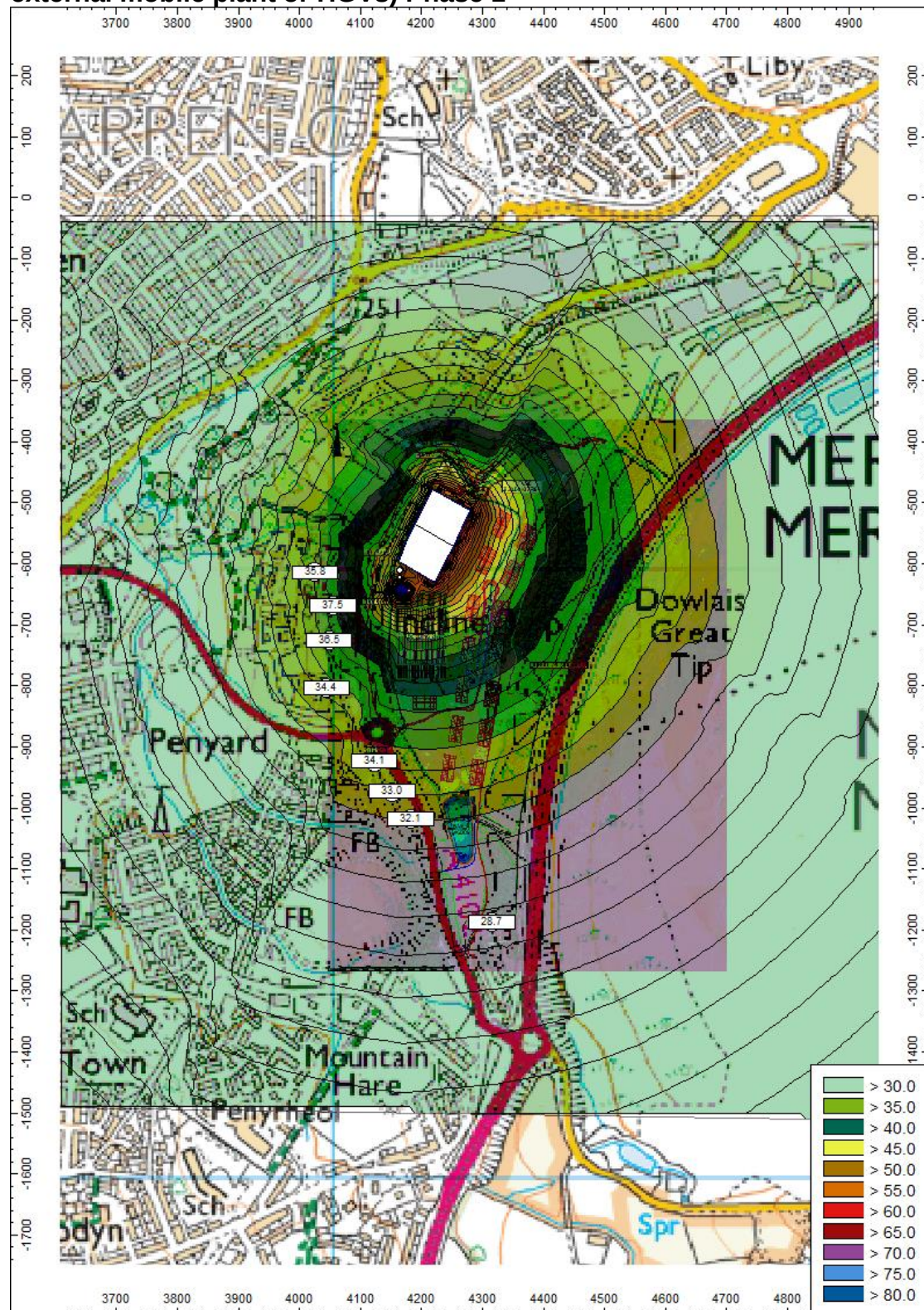
Appendix 4

Noise Mapping Results

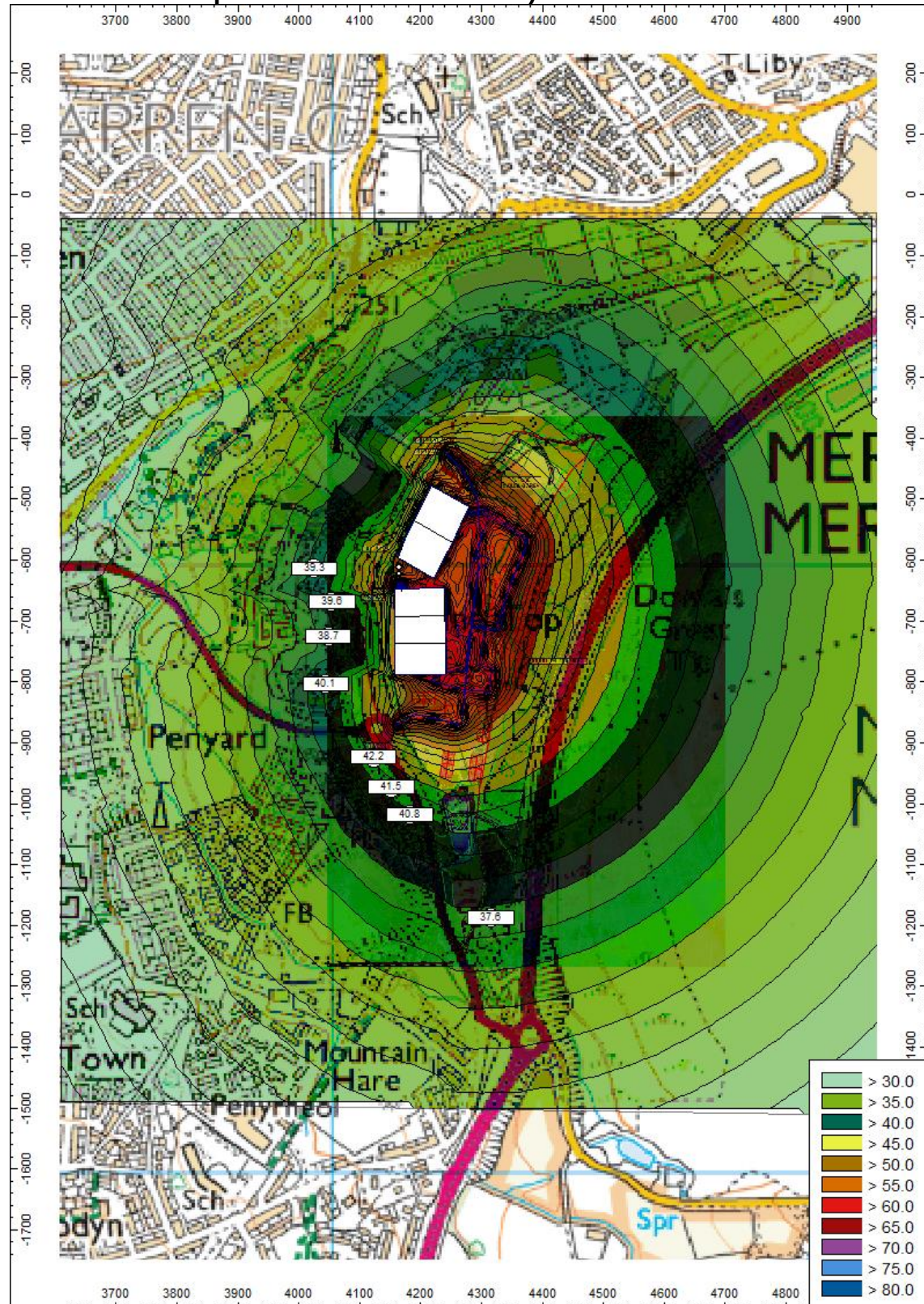
Noise Map 1: Daytime Noise Levels with CHP (all plant operating and includes mobile plant and HGV movement) Phase 1



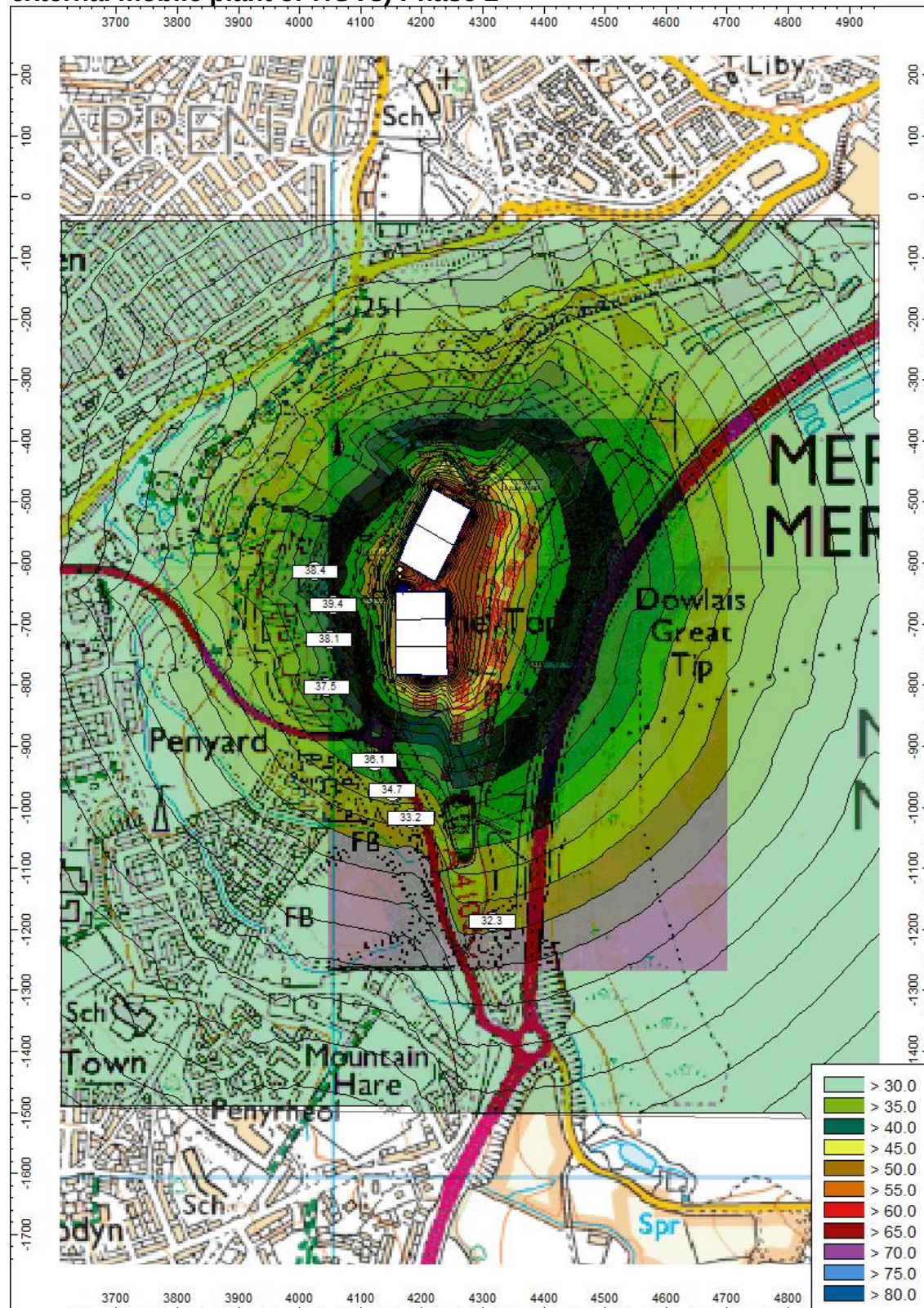
Noise Map 2: Night-time Noise Levels with CHP (all plant operating – no external mobile plant or HGVs) Phase 1



Noise Map 3: Daytime Noise Levels with CHP (all plant operating and includes mobile plant and HGV movement) Phase 2



Noise Map 4: Night-time Noise Levels with CHP (all plant operating – no external mobile plant or HGVs) Phase 2



Appendix 5

Consultant's Experience & Qualifications

**Consultant: Dean Robert Kettlewell - MSc MIOA MAE I.Eng
(Director - Principal Acoustic Consultant)**

Précis

As Director and Principal Acoustic Consultant with Noise & Vibration Consultants Ltd, Dean has over 35 years background experience in a wide range of issues relating to environmental, industrial and commercial noise and vibration assessment. He currently manages corporate and unit specific contracts for:

- Assessment of Environmental & Industrial Noise
- Environmental Noise Impact Assessments
- Expert Witness representation for Deafness and 'Vibration White Finger' Claims
- Integrated Pollution Prevention and Control (IPPC) Applications
- Industrial Noise Assessment and Control
- Planning Issues for Residential and Commercial Development
- Noise at Work Regulations Assessments
- Building Acoustics and Sound Insulation Tests
- Wind Farm Noise Impact Assessments
- Entertainment Noise Assessment and Control
- Architectural Acoustics
- Specialist knowledge in the Design of Noise Control Systems
- Ground borne vibration measurement and assessment
- Project Management of Noise Control Systems
- Hand-arm Vibration Assessments

Relevant Work Experience

Director & Principal Consultant - Noise & Vibration Consultants Ltd	2001- to date
Senior Acoustic Consultant - Vibrock Limited	1998 - 2001
Associate & Principal Acoustic Consultant - John Savidge & Associates	1994 - 1998
Technical Manager – LBJ Limited (Noise Control Division)	1990 - 1994
Technical Engineer/Technical Manager (1988) - Vibac (Noise Control) Ltd	1982 - 1990

Qualifications and Education

M.Sc. Applied Acoustics (Derby University – Distinction)
HNC Electrical & Electronic Engineering
IOA Diploma in Acoustics & Noise Control
IOA Certificate in Law and Administration
Certificate of Competence in Workplace Noise Assessment
Certificate of Competence in Ground Vibration Monitoring

Affiliations: Member of Institute of Acoustics (MIOA)
 Member of Academy of Experts (MAE)
 Member of Association of Noise Consultants (ANC)
 Incorporated Engineer (I.Eng)

