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BRITANIACREST RECYCLING, HORLEY

NOISE IMPACT ASSESSMENT

Environmental Permit Variation Application

For: Britaniacrest Recycling Limited
By: Chris Wood MSc MIOA

Permit Ref.	EPR/BP3390EB
Our Ref.	222_01R_1-0_CWA
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CONTENTS

1. INTRODUCTION AND SUMMARY

1.1 Chris Wood Acoustics has been commission by Britaniacrest Recycling Limited to undertake a noise impact assessment to support an application to the Environment Agency to vary its existing permit (EPR/BP3390EB). The site address is **Little Orchard Farm, Reigate Road, Horley RH6 0HJ**, whilst the requested changes are for: **the crushing of hardcore and the processing of residual waste outside**; and **an increase in tonnage from 250,000 to 300,000 per year**. The site is already permitted to screen inert wastes and process wood wastes outside, as well as the acceptance, handling, storage and loading of all wastes outside.

1.2 Key to note is that: the application is for the 20% expansion of existing operations, on what is a large site, which has been operational since 1996, with no history of complaints; and whilst there are some dwellings in proximity, there is significant acoustic screening, both on site and around the perimeter, with the size of the site resulting in significant separation in the majority of instances. The hours of the site are 07:00-17:00 Monday to Friday, and 07:00-12:00 on Saturdays, thus avoiding potentially more noise-sensitive evening and night-time period, and Sundays and bank holidays.

1.3 An assessment has been requested by the Environment Agency, to be undertaken in accordance with **BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound** and the Environment Agency's guidance. It is the Environment Agency's position that the site should be assessed against conditions as if it didn't exist, and not just in terms of any changes to existing conditions, but where the relevant contextual factors will be considered when determining the potential significance of sound emissions in practice and the decision whether to approve the application.

1.4 Accordingly, the site has been visited on two occasions, and short-term attended and long-term unattended sound level measurements having been made on and off the site. The site visits and measurements reveal that the site was operating appropriately, and thus in a controlled and expected manner. It is, however, a large site, handling a range of wastes material, whereby sound emissions beyond the site boundary are inevitable.

1.5 The site operations essentially comprise three key elements: the import and export of the unprocessed and processed material via heavy vehicles; the processing of the waste by various means; and the means of moving the material (between the vehicles/where the material is unloaded and the processing input and output stations and storage locations), primarily via handlers and loaders. In addition to which, there is the maintenance of the vehicles and machinery, the staff vehicles and parking, and, in this instance, a skip storage area and associated vehicle movements.

1.6 In terms of processing, this includes a crusher (for the harder materials) and a shredder and trommel for softer materials, together with the "fines cleaner" waste plant, which combines a further shredder, screener and air drum separator (with associated blower), which, together with manual picking stations, separates the waste into a number of types. There is also baling machine and bale wrapper – the bales being loaded on to articulated lorries by forklift truck. Any metal, which is limited, is sent elsewhere for processing.

1.7 The capacity for the proposed 20% increase in tonnage comes from the greater capacity and efficiency of the latest waste plant, whilst should also mean the ability to reduce waste going to landfill to zero.

1.8 In terms of the activities in the open, the crusher and shredder emit the most sound, but which are located furthest away from the properties, with plenty of intervening acoustic screening. The crusher is also not used all the time. The trommel is somewhat quieter, as are the handlers, loading shovel and lorry movements, but where there are typically constant movements in these regards, with regular occurrences of white noise alarms.

1.9 The skip storage area is largely inactive, with empty skips (for hire) typically loaded in the afternoon, prior to departure from 7.00 am onwards the following morning. This element of the site, much like the other external elements, has been a feature of the site since the beginning.

1.10 Also outside are elements of the waste plant, along the southern end of the main building, at 'first floor' level. In addition to a picking station, there is a screener and "density separator" (using air separation technology), which culminates in eight bays of sorted material at ground level. At the far, screener end, the sound level is between that of the shredder and trommel, with the sound reminiscent or a cement mixer, with the sound level reducing back towards the site, where levels are more likely dictated by other activity than the nearest waste plant elements. It should be noted that, like elsewhere on site, there is significant physical screening on the boundary at this end and corner of the site.

1.11 Which largely leaves the plant and activities inside the building, which houses the majority of the waste plant, including the shredder, a second screener, the air drum separator and the blower. It also houses the baling machine and bale wrapper, with the former and shredder each being fed via a handler or excavator, with the shovel loader delivering and removing waste both ends of the building. Some waste deliveries are also made directly within the building, whilst the bales are collected via an opening on the north elevation by a forklift truck. The bales are stacked outside until being loaded onto articulated lorries. The sound levels in the building are relatively high, at up to around 85 dB ($L_{Aeq,T}$).[1]

1.12 In addition to the above is the road sweeper. This is actually one of the most prominent sources of sound on the site, with a tonal character, and, since it operates in the central and eastern sections of the site, unlike the other main plant, it was found to be the most audible at the nearest dwellings. Otherwise, whilst the site was generally audible at the nearest dwellings, sources were largely undiscernible, with the sound environment typically dominated by other sources, particularly the road traffic on Reigate Road and the regular aircraft movements. Bird song and bird calls, from a variety of species, was a notable feature, together with dogs barking and gardening in neighbouring gardens, and the occasional aircraft and helicopter.

1.13 For the nearest residential premises, an assessment has been undertaken based on the guidance in **BS 4142**, whereby the measured and calculated operational sound levels have been compared to the background and residual conditions at the properties, and the potential noise impact determined, taking context into account as far as is practicable.

1.14 Adopting a worst-case approach of comparing the site sound levels, including character corrections, with the background conditions typically, results in a difference of up to +14 dB (or +8 dB if the road sweeper is excluded). For a new site, this could indicate a potentially significant impact, but where the site has existing use and the specific sound levels are typically below the upper threshold for external amenity. Indeed, the author is aware of example cases where background levels were exceeded by up +20 dB, which were considered acceptable by the Environment Agency at the time in context.

1.15 Overall, it is considered that the controlled operation of the site should not result in a significant adverse noise impact. Indeed, based on the wording in the **National Planning Policy Framework**'s guidance, and given the specific context, it is considered that there should be **No Observed Adverse Effect**, whereby "Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life."

1.16 In broad terms, therefore, it is considered that, where the site operates as it was witnessed to do so, it could be considered to be operating appropriately. One key area where improvement could be beneficial is in terms of the road sweeper, and so this is being considered. A wheel wash was not found to be sufficient but could perhaps be used in tandem with the road sweeper, together with the use not starting until after 8.00 am and being limited as far as reasonable. It might also be that a quieter machine is available.

1.17 Accordingly, notwithstanding such measures, it is considered that noise need not be a barrier to the Environment Agency providing the required Permit.

[1] 85 dB $L_{Aeq,8h}$ is the Control of Noise at Work Regulations 2005 upper action level, whereby the area is due to be designated a Hearing Protection Zone.

1.18 This report is set out as follows: Statements of the surveyor and author's credentials are presented in **Section 2**. Policy and assessment requirements are presented in **Section 3**. Descriptions of the site and nearest receptors are given in **Section 4**. The baseline survey and on-site measurement details and results are given in **Sections 5** and **6**. **Section 7** presents details of the acoustic modelling and the assessment of the operational sound levels in keeping with the guidance in **BS 4142**. **Section 8** presents discussion on control measures, whilst conclusions and next steps, where applicable, are given in **Section 9**. A glossary of terms in presented as **Appendix A**, details of the national noise policy is given in **Appendix B**, the sound level measurement equipment calibration certificates are presented in **Appendix C**, whilst the unattended survey results are tabulated in **Appendix D**.

2. STATEMENT OF QUALIFICATIONS, COMPETENCY, PROFESSIONAL MEMBERSHIPS AND EXPERIENCE

2.1 The survey and the preparation of this report have been undertaken by Mr Chris Wood. Chris has over 25 years' relevant experience in acoustics, sound, noise and vibration. He is a Corporate Member of the Institute of Acoustics (MIOA), and has the Diploma and Master of Science Degree from the IOA in Acoustics and Noise Control. He has undertaken a number of surveys and assessments for similar schemes, and for many other industrial and commercial schemes, whilst following the relevant guidance.

3. POLICY AND ASSESSMENT REQUIREMENTS

NATIONAL POLICY

3.1 The current national policy regarding "noise" is presented in **Appendix B**. Since the associated documentation doesn't include detailed assessment methodology or criteria, it is still necessary to refer to applicable guidance documents, as presented below. However, the **National Planning Policy Framework** (**NPPF**) does include helpful descriptions in terms examples of outcomes based on different levels of noise exposure, which have been referred to in this report.

ENVIRONMENT AGENCY REQUIREMENTS

NOISE AND VIBRATION MANAGEMENT: ENVIRONMENTAL PERMITS (UPDATED 31 JANUARY 2022)

3.2 The Environment Agency, together with the Scottish Environment Protection Agency (SEPA), Natural Resources Wales and Northern Ireland Environment Agency, has produced the guidance **Noise and vibration management: environmental permits** (Updated 31 January 2022) to help holders and potential holders of permits apply for, vary, and comply with their permits.

3.3 It includes the following statements:

> Operators must prevent significant pollution and also comply with the requirements to use 'appropriate measures' (Waste Framework Directive 2018/851) or 'best available techniques' (BAT) to prevent or minimise noise pollution.
>
> Noise impact assessments should be carried out to an appropriate standard and by competent personnel, for example, holders of either an Institute of Acoustics… Diploma in Acoustics and Noise Control… Certificate of Competence in Environmental Noise Measurement…
>
> 'BS 4142: Methods for rating and assessing industrial and commercial sound'… must be used …to quantify the level of environmental noise impact from industrial processes.

3.4 The following four steps are outlined:

> Step 1: desktop risk assessment
>
> Step 2: off-site monitoring survey
>
> Step 3: source assessment
>
> Step 4: BAT or appropriate measures justification

3.5 For the most part, following the guidance in **BS 4142**, as outlined further below, is the main requirement. In terms items specific to the Environment Agency guidance, there is reference under Step 3 to the following:

- Unacceptable level of audible or detectable noise. It is stated that, "The closest corresponding BS 4142 descriptor is 'significant adverse impact' (following consideration of the context)."
- Audible or detectable noise. "The closest corresponding BS 4142 descriptor is 'adverse impact' (following consideration of the context)."
- No noise, or barely audible or detectable noise. "The closest corresponding BS 4142 descriptor is 'low impact or no impact' (following consideration of context)."

3.6 Also specific to the EA guidance, Step 4 briefly covers the requirement to demonstrate BAT (best available techniques) or appropriate measures, which are interchangeable terms within the guidance. It is stated that, "The BAT justification is the critical part of any noise impact assessment submitted to the environment agencies." Indeed, whilst not covered by **BS 4142**, this is a natural and important extension to the **BS 4142** assessment.

3.7 The guidance goes onto cover the following topics to some extent. The relevance in this instance is noted as follows:

- Noise impact on other species. Understandably, the guidance in limited in this regard, and where the assessment of which is outside the scope of **BS 4142**. Other than the horse training area located to the north of the wider site area, behind Sunny Acres, 18 Reigate Road, which is reasonably remote and physically screened from the main site – it was also constructed in recent years – there is anticipated to be little, if any, need for an assessment in this regard; but where, in any case, it is assumed that the assessment presented in terms of human receptors would provide an adequate guide to the potential impact on other species.
- Vibration impact assessments. We see no reason for vibration to be an issue under normal operational conditions, and so this is not considered further.
- How the context affects an assessment. The advice, which is similar to that in **BS 4142** in any case, is considered within the assessment presented in **Section 7.2**.
- Dealing with uncertainty. The advice, which is, again, similar to that within **BS 4142**, is considered within the assessment presented in **Section 7.3**.
- Soundscape assessment. This is not to be confused with the assessment of tranquillity, which is not mentioned in the guidance, and not considered relevant here. Soundscape is defined as the "acoustic environment as perceived or experienced and/or understood by a person or people, in context"[2]. The aim being to fully describe and/or account for all sounds present when considering the outcome from a human perspective. This should, however, be adequately covered by considering "context" as part of the **BS 4142** assessment, whereby it is not considered necessary to cover this separately.
- Noise conditions in permits. There are no noise conditions in the current permit.
- Appropriate measures to meet permit conditions. This section includes generic good practice guidance on appropriate measures to reduce or control noise. This is considered within **Sections 7** and **8**.
- Noise management plans (NMP). Advice is provided on preparing a NMP. The Noise Management Plan for the site has been prepared by others.
- Engaging with neighbours. Advice is provided on engaging with neighbours, including in terms of responding to complaints. This is not relevant to this report, but where the advice on responding to complaints is followed in the Noise Management Plan.
- Monitoring. A brief overview of the monitoring methods is provided. As above, this is accounted for in the Noise Management Plan.
- Suggested noise impact assessment (NIA) report structure. The advice is reflected in the structure of this report, with the required information having been provided.

3.8 Notably, being based around the **BS 4142** methodology, where conditions are to be judged on a case-by-case basis, no sound level thresholds or other acoustic-based criteria are presented in the Environment Agency guidance. We are aware, however, of example cases where background levels were exceeded by up +20 dB, which were considered acceptable by the Environment Agency at the time in context.

METHOD IMPLEMENTATION DOCUMENT (MID) FOR BS 4142

3.9 In addition to the above, the Environment Agency published **Method implementation document (MID) for BS 4142 (MID4142)** in March 2023, which "explains how to use 'BS 4142 Method for rating and assessing industrial and commercial sound' when monitoring sound for an environmental permit." This has been followed as far as considered necessary for the preparation of this report.

[2] BS ISO 12913-1 Acoustics — Soundscape — Part 1: Definition and conceptual framework

BAT REFERENCE DOCUMENTS

3.10 The above Environment Agency guidance requires consideration of BAT (best available techniques), which is the consideration of the available techniques best for preventing or minimising emissions and impacts on the environment. In this regard, the European Commission (EC) produces BAT reference documents (BREFs) for installations.

3.11 Applicable to this site, there are BREFs for ferrous and non-ferrous metals processing, refs. BREFBATC (11.2022) and BREFBATC (06.2016), respectively. Brief, generic guidance is provided in the latter, covered in the Environment Agency guidance in any case, whilst the following table is provided in the former (referred to in the BREF as BAT 33). The table is proceeded by the statement: "In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below."

Table 3.1: BAT 33 table from BREFBATC (11.2022)

Technique		Description	Applicability
a.	Appropriate location of equipment and buildings	Noise levels can be reduced by increasing the distance between the emitter and the receiver, by using buildings as noise screens and by relocating the exits or entrances of the buildings.	For existing plants, the relocation of equipment and the exits or entrances of the buildings may not be applicable due to a lack of space and/or excessive costs.
b.	Operational measures	These include techniques such as: — inspection and maintenance of equipment; — closing of doors and windows of enclosed areas, if possible; — equipment operation by experienced staff; — avoidance of noisy activities at night, if possible; — provisions for noise control, e.g. during production and maintenance activities, transport and handling of feedstock and materials.	Generally applicable.
c.	Low-noise equipment	This includes techniques such as direct drive motors, low-noise compressors, pumps and fans.	
d.	Noise and vibration control equipment	This includes techniques such as: — noise reducers; — acoustic and vibrational insulation of equipment; — enclosure of noisy equipment (e.g. scarfing and grinding machines, wire drawing machines, air jets); — building materials with high sound insulation properties (e.g. for walls, roofs, windows, doors).	Applicability to existing plants may be restricted by a lack of space.
e.	Noise abatement	Inserting obstacles between emitters and receivers (e.g. protection walls, embankments and buildings).	Only applicable to existing plants, as the design of new plants should make this technique unnecessary. For existing plants, the insertion of obstacles may not be applicable due to a lack of space.

3.12 The above represents good practice guidance, therefore, but where, perhaps to be expected, no specific guidance, criteria or examples are given. Key, however, is the recognition that space and cost constraints are to be taken into account.

BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

3.13 As per the title, **BS 4142** provides methods for rating and assessing sound/noise of an industrial or commercial nature in relation to residential premises. The assessment methodology evaluates the "specific sound level" of each industrial or commercial sound source, corrects, where required, for distinguishable features to derive the "rating level", and compares this with the "background sound level".

3.14 The advice is that the background sound level ($L_{AF90,T}$) should be derived from continuous measurement of normally not less than 15 minute intervals over the period of interest, and that it should not be the lowest level, but representative of typical conditions at the noise-sensitive receiver(s) relevant to the period(s) of operation.

3.15 The specific sound level (Ls = $L_{Aeq,Tr}$) is obtained (by measurement or calculation) over a reference period of 1 hour in terms of the daytime (07:00 to 23:00) and 15 minutes during the night-time (23:00 to 07:00).

3.16 The rating level ($L_{Ar,Tr}$) is the specific sound level corrected to account for any acoustic features present in the sound in question, as experienced at the receptor, such as distinguishable, discrete, continuous note (a whine, hiss, screech or hum etc.) or distinct impulses (bangs, clatters or thumps etc.). Where no correction is warranted, the rating level is equal to the specific sound level.

3.17 The "subjective method" to calculate the rating level incorporates the following corrections (particularly appropriate for new sources that cannot be measured in-situ):

- up to +6 dB due to tonality, subjectively this might be +2 for a tone that is just perceptible, +4 where it is clearly perceptible and +6 where it is highly perceptible;
- up to+9 dB for impulsivity, subjectively this might be +3 for impulsivity that is just perceptible, +6 where it is clearly perceptible and +9 where it is highly perceptible; and
- up to +3 dB for other acoustic features that are neither tonal nor impulsive, though readily distinctive at the receptor.

3.18 An "initial estimate" of the impact of the specific sound is calculated by subtracting the background sound level from the rating level. The following advice applies:

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

3.19 Key is the statement "depending on context", since the significance of the sound in question 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 effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur.

3.20 Where the initial estimate of the impact needs to be modified due to the context, the assessment should take into account all pertinent factors, including:

- the absolute level of sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

3.21 Helpfully, **BS 4142** includes some example assessments, one of which includes the following statement:

> …the residual acoustic environment varies considerably with time, which also tends to mask sound from the source, reducing its relative significance…

3.22 An assessment, therefore, is effectively in two parts. The first part results in an initial indication of the impact, which is subsequently considered in terms the context unique to the situation at hand; and where this second part may require consideration of alternative guidance and metrics. Alternatively, the context can be considered upfront and a specific threshold (or set of thresholds) determined accordingly in place of the default values presented in points a) to d) quoted above.

BS 8233 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

3.23 The core method in **BS 4142** (outlined above) compares the sound in question with the background conditions (i.e. part one of an assessment). When it comes to part two – taking into account context – it is in keeping with the **BS 4142** guidance to also consider the significance of the absolute level of the commercial/industrial sound. This is typically done in terms of the absolute noise thresholds given in **BS 8223**. This provides guideline values for internal and external noise levels for dwellings.

3.24 It states that, "In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4." This table is reproduced as Table 4.2 below.

Table 3.2: BS 8233 indoor ambient noise levels for dwellings

Activity	Location	07-23 (Daytime)	23-07 (Night-time)
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

3.25 For habitable rooms, the lower guideline value is 35 dB $L_{Aeq,16h}$ during the daytime period, and where the value for bedrooms at night is 30 dB $L_{Aeq,8h}$. Assuming a partially open window providing 15 dB (during use for cooling, for example), the equivalent external level/limit would be in the order of 50 dB during the daytime period and 45 dB during the night-time period. This is a free-field level unaffected by any façade-reflected sound.

3.26 In respect of sound levels within outdoor amenity areas, the guidance in **BS 8233** suggests that, "it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments…"

3.27 **BS 8233** does caution that the internal guideline values are for sources without a specific character, and that where any such characteristics are present, "lower noise levels might be appropriate." Accordingly, when it comes to internal conditions and commercial/industrial sound of any nature, some reduction in the standard values would be considered prudent, subject to context, but where sufficient attenuation would likely be achieved by closing windows should the occupants prefer to do so. Either way, external levels of no more than 50 dB during the day can be seen to be relatively low, with 55 dB being acceptable in noisier environments.

GUIDANCE SUMMARY

3.28 Based on the guidance in **BS 4142** for an "initial estimate of impact", a rating level the same as the background sound level is an indication of a low impact, depending on the context.

3.29 Whilst, based on the guidance in **BS 8233**, as referenced in **BS 4142**, external levels of no more than 55 dB during the day would meet the upper external noise criteria for dwellings.

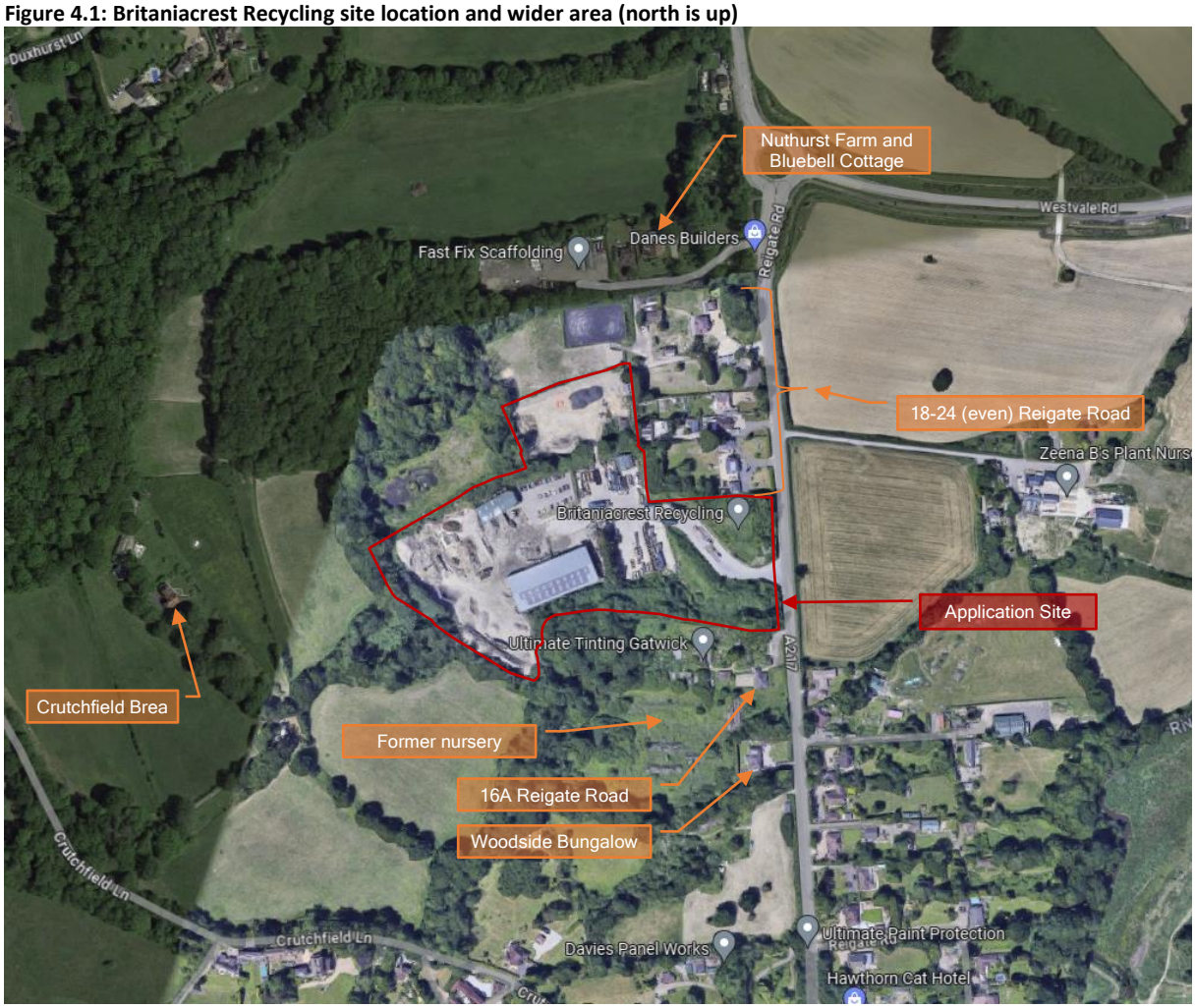
3.30 Ultimately, therefore, the judgement of noise impact/the potential significance of sound depends on a combination of the background sound level(s), the site-specific contextual factors and/or the absolute sound levels. Accordingly, these are considered in **Section 7**.

4. THE SITE AND ENVIRONS

THE SITE AND NEAREST RECEPTOR LOCATIONS

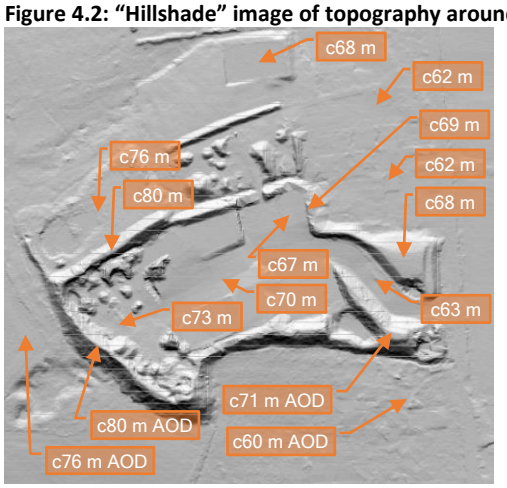
4.1 The site and nearest noise-sensitive receptors are shown in the figure below, together with an indication of the site topography. Note, the operations on site are described in the following subsection.

Figure 4.1: Britaniacrest Recycling site location and wider area (north is up)



Source: Imagery ©2023 Google (annotated by Chris Wood Acoustics)

Figure 4.2: "Hillshade" image of topography around the Britaniacrest Recycling site (north is up)



Source: Defra (prepared by Chris Wood Acoustics based on 2022 LiDAR Composite DTM data at 1m resolution)

4.2 The nearest residential properties (i.e. dwelling), therefore, are those to the northeast of the site on Reigate Road. Most of which are owned by the applicant, with members of the family living in the very nearest property, but where they have been assessed regardless of this.

4.3 There are also the two properties to the southeast on Reigate Road, plus those on Crutchfield Lane to the south and west, which includes the isolated property known as Crutchfield Brea. Having observed the conditions in the vicinity of these properties, however, it was considered appropriate to focus on those to the northeast.

4.4 Site photographs showing the properties and grounds are presented in **Section 5**.

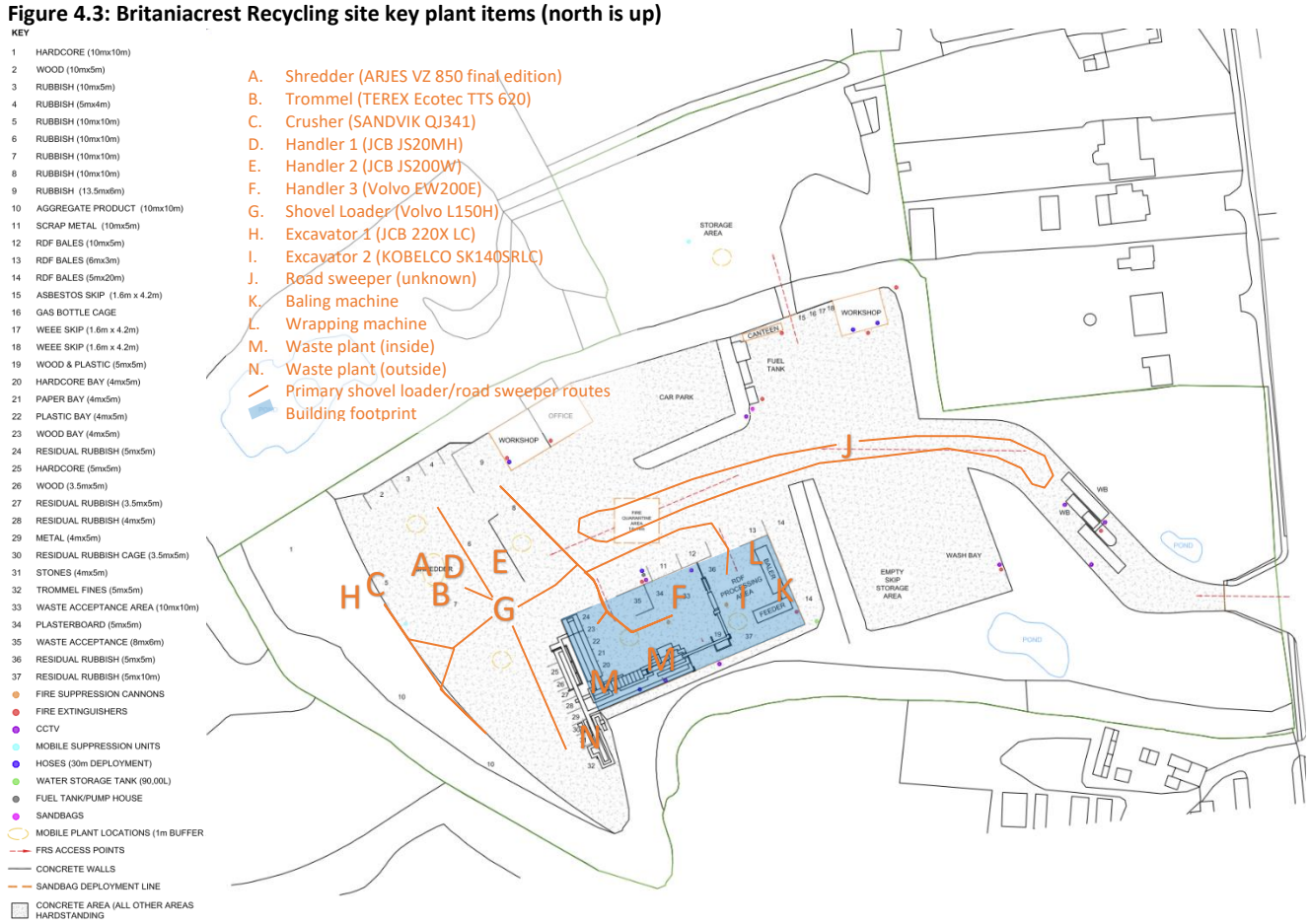
4.5 Otherwise, there is the surrounding woodland and farmland, but which are not considered to be particularly noise-sensitive.

THE SITE OPERATIONS

EXISTING

4.6 The operation of the site is described in **Section 1**. The key items of plant are listed below and their location indicated in **Figure 4.3** (see also the site photographs presented in **Section 6**):

Figure 4.3: Britaniacrest Recycling site key plant items (north is up)



Source: Shane Tasker (annotated by Chris Wood Acoustics)

4.7 In addition to which there are the skips and skip lorries, and at two forklift trucks, which operate to the northeast of the building, where the bales are removed from the building and stored and loaded nearby. There are also a power generator and hydraulic power pack half along the front of the building.

4.8 In terms of vehicle movements, the site accepts an average of 115 loads in and sends 33 loads out per day, spread between 7.00 am and 4.30 pm. Most head through the centre of the site towards the shredder where there are various allocated unloading areas. Those collecting material, such as soil, are loaded close to the western end of the building. The few articulated lorries collecting the baled material do so close to the eastern end of the building.

4.9 Accordingly, the loading shovel is in more or less constant use, as is one of the forklift trucks. There was a second loading shovel, but where typically only one was being used at a time. The shredder and trommel are also in regular use, likewise the two handlers (which have wheels, rather than tracks), either feeding the shredder and/or loading or unloading vehicles. On average, the crusher runs less often, on a campaign basis, but where it can run most of the days that it is required. The waste plant runs most of each day, stopping at times for welfare breaks for the picking station staff.

PROPOSED

4.10 The site is already operating as proposed in relation to the crusher and processing of residual waste, and so the only change to come would be handling the up to 20 % of additional waste; but where the only change this would bring would be up to 20 % extra related vehicle movements to site. Which, given these would be spread out evenly (over the year), would result in no more than a 1 dB increase in the overall sound from such movements, which shouldn't be significant. Furthermore, since the vehicle movements are not the dominant sources of sound on site, with the access road being particularly well-screened from the receptors, any change in the total sound levels from the site would be less than 1 dB. On balance, therefore, this proposed change, regardless of the overall sound levels from the site, is anticipate to be negligible with respect to noise.

5. BASELINE SOUND LEVEL MEASUREMENTS

TIMING, LOCATION AND EQUIPMENT DETAILS

5.1 In order to describe the existing acoustic environment at the noise-sensitive receptor, a combination of attended and unattended sound levels measurements were made, the latter over a five-six day period between 12:30 hours on Wednesday 6th and 11:00 hours on Monday 11th December 2023.

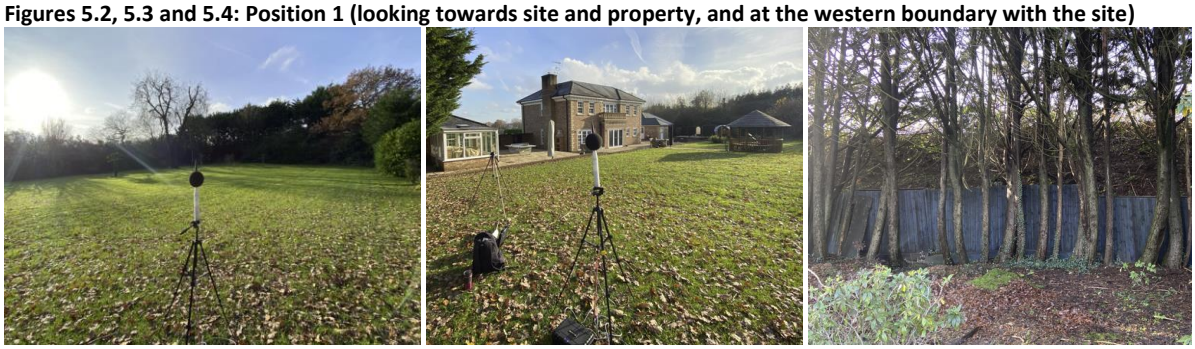
5.2 The positions are shown in the figures below. Permission was gained to install a sound level meter in the rear garden of the nearest property, 24 Reigate Road. There was a small water feature close to the property and the southern boundary, and so a location near this was avoided. The second meter, for the second set of unattended measurements, was installed on the site boundary with the rear of the properties further to the north. Locations near trees could not be avoided. In terms of second position, little additional sound from the trees (due to any rain or wind) is not to be expected. At the first position, some leaf movement sound, or psithurism, is to be expected, but not atypically so.

5.3 Prior to these longer-term measurements, and also at the end of the survey, measurements were made on site in proximity to various sources and activities. These are described in the following section.

Figure 5.1: Unattended baseline sound level measurement locations (north is up)

Source: Imagery ©2023 Google (annotated by Chris Wood Acoustics)
Note: What3words location address provided with the position labels

Figures 5.2, 5.3 and 5.4: Position 1 (looking towards site and property, and at the western boundary with the site)



Source: Chris Wood Acoustics (images captured 6th December 2023)

Figures 5.5 and 5.6: Position 2 (looking towards properties and the site (the latter from on top of the earth bund)

Source: Chris Wood Acoustics (images captured 6th December 2023)

5.4 As can be seen, the microphones were protected with windshields and mounted in broadly "free-field" conditions (i.e. generally away from acoustically reflective surfaces), approx. 1.5 m above the local ground.

5.5 The equipment details are presented in **Table 5.1** below, and where the meters were set to store the 15-minute L_{Aeq} ("ambient"), L_{AF90} ("background") and L_{AFmax} ("maximum") levels, together with the corresponding unweighted frequency spectra in the one-third octave-bands between 20 Hz and 20,000 Hz. The sound pressure levels (L_{Aeq} and L_{eq} in one-third octave-bands) were also obtained at a resolution of 1 second.

5.6 Each measurement chain was field-calibrated before the survey using an acoustic calibrator to generate a level of 114.0 dB at 1 kHz. The level was checked at the end of the survey. The drift in levels were less than 0.1 dB in both instances, which is not significant. The meters and calibrator hold valid laboratory calibration certificates, as presented **Appendix B**.

Table 5.1: Survey equipment details

Equipment (ID / Position)	Make & Model	Serial No.
Sound level meter (SLM1 / Position 1) Microphone / Preamplifier	Svantek 971A ACO 7152 / Svantek SV 18A	121136 84699 / 113784
Sound level meter (SLM2 / Position 2) Microphone / Preamplifier	Svantek 971A ACO 7152 / Svantek SV 18A	131651 85537 / 139344
Sound level calibrator	SV33B	140764

WEATHER CONDITIONS

5.7 At the time the equipment was installed, and the majority of the attended measurements were taken, i.e. during the morning of Wednesday 6th December, conditions were dry and calm, with limited cloud cover (as seen in the images above). A handheld anemometer was used to measure the temperature and wind speed, which were 2°C to start, raising to 5°C, with no measurable wind. According to the forecast, what little wind there might have been was predominantly easterly (i.e. towards the west) (see **Table 5.2** below).

5.8 It was also dry with limited wind on the day of collection and additional attended measurements, Monday 11th December, with temperatures between 9 and 10°C, and wind speeds less than 2 m/s (or 4 mph), which was far less than forecast. The wind direction was judged to be westerly, which matched with the forecast conditions. At the times of the attended measurements, therefore, the conditions were conducive to the reliable measurement of sound, without risk of unwanted effects on the microphone, for example, whilst on the last day (together with other days during the survey, see below), the wind direction was both worst case in terms of sound propagation (from the site to the properties) and the prevailing case.

5.9 In terms of the conditions during the unattended monitoring, these have been determined as shown in **Table 5.2** based forecasts on the BBC website, which were checked and noted daily. As relevant to the operation of the site, the daytime conditions are described only.

Table 5.2: Summary of daytime weather conditions

Date (Dec. '23)	General description (according to BBC website)	Predominant wind direction (towards the…) (and speed, mph)	Temperature (degrees Celsius)		Rain?
			High	Low	
Wed 6th	Misty and light winds	WNW (3)	5	1	None
Thu 7th	Light rain and a moderate breeze	NNW (10)	7	6	Likely at times [1]
Fri 8th	Sunny intervals and a gentle breeze	NE (9)	10	6	None
Sat 9th	Light rain and a moderate to fresh breeze	N (11) (am) E (18) (pm)	13	6	Likely in the am [2]
Sun 10th	Light rain showers and a moderate breeze	N (10) (am) ENE (11) (pm)	12	8	Likely at times [3]
Mon 11th	Sunny intervals and a moderate breeze	ENE (6)	11	9	None

1 On the Thursday, audio recordings suggest rain between around approx. 5 am and 7 pm.
2 On the Saturday, audio recordings suggest rain between around approx. 5 am and 11 am.
3 On the Sunday, audio recordings suggest rain between around approx. 11 am and 3 pm.

5.10 On the Wednesday, Friday and Monday, therefore, with limited winds speeds and no rain, conditions were conducive to reliable sound level measurement. The data from the Thursday, Saturday and Sunday are to be viewed with some caution, as considered further below.

5.11 In terms of wind speeds, these were typically below 11 mph, which is equivalent to the limit of 5 m/s recommended in BS 4142, whereby the majority of the data should not be adversely affected in this regard. Speeds where higher at times on the Saturday, however, whereby, again, the data are to be viewed with caution.

5.12 Accordingly, in terms of the potential effect on the microphone and local acoustic conditions, the weather conditions for the majority of the time are considered conducive to the reliable measurement of sound. In terms of the potential effect of the weather on the propagation of sound, this is considered in the following subsection.

5.13 Generally speaking, therefore, with the survey covering a number of days, and different wind directions – with adverse conditions in the minority – it is considered that sufficient sound level data have been obtained for the purposes of a robust assessment.

OBSERVATIONS

ON SITE

5.14 Across the author's 1st and 2nd visits, approximately five hours were spent on site.

5.15 The site was orderly and active, with a high regard for health and safety, which is always a good sign with respect to overall control. All plant items appeared to be modern examples (see the photographs in **Section 6**), with no evident maintenance issues.

5.16 The crusher was not needed at the time of the initial site visit, but which was used during the survey period and witnessed and measured during the return site visit. The experience of which was as expected, and not discernible at the nearest properties due to the significant intervening physical screening, distance and the variety of other site and non-site sources. Likewise with the shredder and trommel. The author does not see a particular issue with these being out in the open, as would typically be the case on such sites.

5.17 The recently installed waste plant located external to the building was mostly relatively quiet, with the exception of the screener, with sound emissions similar to that of the trommel (notably quieter than the crusher and shredder), but where this is physically well-screened from the surrounding area.

5.18 Conversely, acoustic conditions inside the building were relatively high, but only as to be expected given the nature and number of the plant and activities located therein, including a shredder, screening, blower, two handlers, and the baling machinery, with regular movements by the shovel loader.

5.19 Any spill of sound from the building into the site wasn't entirely obvious due to the activity on the rest of the site, including the regular vehicle movements, but where some is to be expected given the requirement for permanent openings to the front (at each end) during operation for the shovel loader and forklift truck movements.

5.20 However, despite the items and activities mentioned above, arguably the most regularly notable sound source on site was the road sweeper, which operated primarily along the central spine of the site, down towards the weighbridge on the access road. At the time of the survey, which followed a recently rainy period, the road sweeper was being used for the majority of the time. Indeed, with a tonal content at around 400 Hz, which is entirely normal for a road sweeper, and given its greater proximity to the properties than the other key plant, the road sweeper was audible and discernible at the properties.

OFF SITE

5.21 In addition to the time on site, approximately four hours were spent off site, primarily between the two survey locations, but also in the vicinity of Nuthurst Farm and Bluebell Cottage to the north, and the properties on Crutchfield Lane to the west and south.

5.22 At the nearest properties to the north, including the measurement locations, and in the absence of the road sweeper, the site could still be audible, but rarely were sources discernible. The exceptions being the occasional "white noise" alarm and the sounding of a vehicle horn. There were often competing or louder sounds, in the form of road traffic on Reiggate Road, which has a speed limit of 40 mph, but is notably straight and free-flowing, the regular aircraft movements, bird song and calls, with additional sounds from neighbouring gardens.

5.23 It is notable that whilst the site is approximately 4.3 km north of Gatwick Airport, it is close to the Airport's departure route (to the east) and the arrival route (from the west) – both just to the north of the site – whereby planes are a regular feature, regardless of operation mode at the Airport.

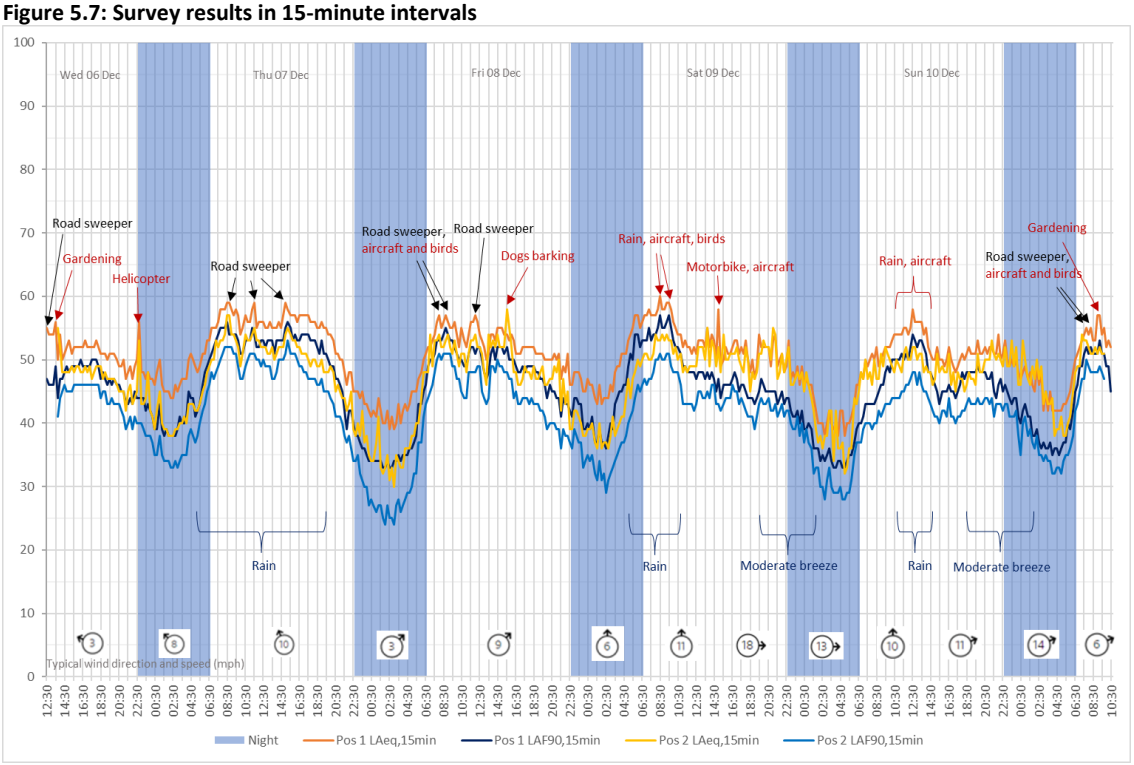
5.24 Typically, at the properties to the north, the site is judged to be less than 50 % of the overall sounds levels, with the exception of when the road sweeper is running, but where levels and tone(s) are not too dissimilar to the aircraft movements. On Crutchfield Lane, the site was not found to be audible, but where it is anticipated it could be just audible, but with no sources discernible, at Crutchfield Brea.

RAW DATA AND INITIAL DISCUSSION

5.25 In the first instance, the 15-minutely data from the measurements at the two longer-term positions are presented in graphical/time-history form in **Figure 5.7** overleaf. It is considered most helpful to compare the two sets of $L_{Aeq,15min}$ (energy average, "ambient" level) and $L_{AF90,15min}$ (90th percentile, "background" level) data. At this stage in the report, it is a case of attempting to best understand the data and how they may or may not interrelate, and/or be a factor of the weather conditions, for example. Key observations are highlighted and discussed subsequently.

5.26 The notes provided with the data are primarily based on brief audio recordings that were triggered at either of the positions. With the exception of the road sweeper, all recordings were due non-site sources, particularly aircraft and birds, with some due to the wind in the trees or rain, as well as other sources.

Figure 5.7: Survey results in 15-minute intervals



5.27 The following are observed from the data:

- The levels at Position 1 (in the garden of the nearest property) were generally higher than at Position 2. This broadly to be expected since Position 1 was closer Reigate Road, as well as the site, and also more likely to be affected by any wind and rain, as mentioned previously.
- The peaks – bearing in mind that are 15-minute values – could seemingly be equally due to the road sweeper or non-site sounds, particularly aircraft and bird calls.
- The rain and/or wind were likely influencing the levels, especially at Position 1, at times. Notably on the Saturday morning, when levels are already elevated before 7 am, with no indication in the audio recording of sound from site. Likewise during Sunday, when there was no activity on site. Whilst such conditions may not necessarily represent the majority of the time, they do go to put the sound levels at the other times into some sort of perspective.
- There are notable "humps" in the $L_{AF90,15min}$ (background) levels, which do correspond with the operational hours of the site, but where some of which, at least, may have been influenced by the rain (as suggested by the hump on the Sunday), with, no doubt, contribution from the road traffic.

5.28 In keeping with the observed conditions, therefore, the operation of the site does, at times, appear to have influence the measured sound levels, but with notable others sources besides. The data is processed and considered further below.

PROCESSED AMBIENT (LAEQ) AND BACKGROUND (LAF90) SURVEY DATA

5.29 In keeping with **BS 4142** methodology, the measured $L_{AF90,15min}$ levels have been analysed to determine what could be considered the typical/representative background sound level(s) per periods of interest. It is also useful, however, to consider the ambient conditions, for which hourly periods are more commonly of interest (in keeping with the **BS 4142** period applicable to specific and rating levels).

5.30 Accordingly, the $L_{Aeq,1h}$ and $L_{AF90,15min}$ levels are as presented in the tables below and overleaf. The latter have been determined in the normal way by logarithmically averaging the $L_{Aeq,15min}$ levels per hour. In addition to the 15-minutely/hourly and daily averages and minimum values, the mode (most commonly occurring) values have been determined for $L_{A90,15min}$ levels. Where more than one mode was found per day, the lowest is presented.

5.31 The levels are presented for the period 06:00 to 19:00, thus including the normal hours of operation (i.e. 07:00-17:00 weekdays and 07:00-12:00 Saturdays), plus the shoulder hours before and after. In fact, an additional hour (18:00-19:00) is included at the end of the day for added measure.

5.32 The levels have been condition formatted in Microsoft Excel using the default Red – Yellow – Green colours to show the range in levels across the hours and days. They are not related to any particular thresholds – just a comparison of the data presented.

Table 5.3: Summary of the ambient ($L_{Aeq,1h}$) sound levels (free-field) – Position 1 (nearest property)

Day (Dec. '23)	06	07	08	09	10	11	12	13	14	15	16	17	18	Ave. 07-17	Min. 06-19
Wed 6th								55	54	52	52	52	52	**53**	**52**
Thu 7th	49	53	56	58	57	56	57	56	55	56	58	57	57	**56**	**49**
Fri 8th	46	50	54	57	56	54	55	55	52	55	54	53	52	**54**	**46**
Sat 9th	55	56	57	58	59	55	52	52	53	52	54	52	52	**55**	**52**
Sun 10th	40	46	49	51	51	53	54	56	55	52	51	50	49	**52**	**40**
Mon 11th	43	49	54	54	53									**53**	**43**
Wkday Ave.	**46**	**51**	**55**	**56**	**55**	**55**	**56**	**55**	**54**	**54**	**55**	**54**	**54**	**54**	

Note: Periods of wind/rain are represented by the corresponding sell being underlined in dark blue.

Table 5.4: Summary of the ambient ($L_{Aeq,1h}$) sound levels (free-field) – Position 2

Day (Dec. '23)	06	07	08	09	10	11	12	13	14	15	16	17	18	Ave. 07-17	Min. 06-19
Wed 6th									50	49	48	48	49	**49**	**48**
Thu 7th	49	52	56	53	52	54	52	51	52	54	52	50	49	**53**	**49**
Fri 8th	47	52	53	53	51	52	52	51	53	55	49	48	48	**52**	**47**
Sat 9th	50	50	53	53	51	49	50	53	51	52	51	50	49	**51**	**49**
Sun 10th	45	48	48	51	49	50	51	50	48	49	49	47	47	**49**	**45**
Mon 11th	47	53	52	51										**52**	**47**
Wkday Ave.	**48**	**52**	**54**	**52**	**52**	**53**	**52**	**51**	**52**	**53**	**50**	**49**	**49**	**52**	

Note: Periods of wind/rain are represented by the corresponding sell being underlined in dark blue.

5.33 The following are observed from the above data:

- The levels were highest (at Position 1) on the Thursday, Friday and Saturday mornings, and on the Thursday afternoon. On the Thursday, this did correspond with periods of the use of the road sweeper, but also rain. On the Friday, there was no rain, but the audio recordings were a combination of the road sweeper, aircraft and birds. On the Saturday, there were no recordings including site sources, but rather the rain aircraft and birds. In other words, the levels cannot be exclusively put down to the site.
- There are not so much of the higher levels at Position 2, but where this position was considered less-effected by the rain or leaf movements sounds. The overall average and minimum levels are not too dissimilar.

5.34 The $L_{AF90,15min}$ data tables are presented next.

Table 5.5: Summary of the background ($L_{AF90,15min}$) sound levels (free-field) – Position 1

Day (Dec. '23)	06:00	06:15	06:30	06:45	07:00	07:15	07:30	07:45	08:00	08:15	08:30	08:45	09:00	09:15	09:30	09:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	18:30	18:45	Ave. (07-17)	Mode (07-17)	Min. (06-19)
Wed 6th																											47	46	46	46	49	44	47	47	48	49	48	49	49	49	49	49	50	49	49	49	49	50	50	50	49	47	48	**48**	**49**	**44**
Thu 7th	48	49	50	51	52	53	54	55	55	55	56	54	54	54	54	53	51	51	53	53	53	55	54	52	52	53	53	52	53	53	53	51	53	53	53	53	55	56	55	53	54	53	53	54	54	54	54	53	53	53	52	51	**53**	**53**	**48**
Fri 8th	43	45	46	49	50	50	51	53	53	53	54	55	54	53	53	52	51	50	50	49	49	51	52	52	51	52	52	50	48	47	48	51	52	50	52	52	52	51	52	50	50	50	49	48	48	49	48	49	49	49	49	48	**51**	**52**	**43**
Sat 9th	54	52	53	53	53	55	53	54	54	55	57	55	55	56	57	55	53	52	52	51	49	49	48	48	48	48	47	48	48	48	47	48	47	48	47	45	47	44	46	46	46	46	47	48	47	45	46	46	45	44	44	44	**50**	**48**	**44**
Sun 10th	37	39	40	40	41	43	43	43	43	43	44	45	46	46	48	49	48	50	50	50	50	51	50	51	50	52	54	53	52	53	53	52	51	48	48	47	46	45	43	45	45	45	46	45	45	44	45	46	48	47	48	48	**48**	**43**	**37**
Mon 11th	39	42	45	46	49	49	51	52	51	52	51	51	51	53	51	51	49	49	48																																					**51**	**51**	**39**
Wkday Ave.	**43**	**45**	**47**	**49**	**50**	**51**	**52**	**53**	**53**	**53**	**54**	**53**	**53**	**53**	**53**	**52**	**50**	**50**	**50**	**51**	**51**	**53**	**53**	**52**	**52**	**53**	**51**	**49**	**49**	**49**	**50**	**49**	**51**	**50**	**51**	**51**	**52**	**52**	**52**	**51**	**51**	**51**	**50**	**50**	**50**	**51**	**51**	**51**	**51**	**50**	**49**	**49**	**51**	**51**	**44**

Note: Periods of wind/rain are represented by the corresponding sell being underlined in dark blue.

Table 5.6: Summary of the background ($L_{AF90,15min}$) sound levels (free-field) – Position 1

Day (Dec. '23)	06:00	06:15	06:30	06:45	07:00	07:15	07:30	07:45	08:00	08:15	08:30	08:45	09:00	09:15	09:30	09:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	18:30	18:45	Ave. (07-17)	Mode (07-17)	Min. (06-19)
Wed 6th																																41	44	45	46	45	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	44	45	**45**	**46**	**41**
Thu 7th	43	45	46	48	47	48	49	50	51	52	52	52	52	51	51	49	47	47	49	50	51	51	51	50	50	49	50	49	49	49	47	47	48	50	50	50	51	53	51	51	51	50	49	49	48	48	47	47	47	47	46	46	**50**	**51**	**43**
Fri 8th	37	41	43	44	45	46	48	50	51	50	51	51	51	51	49	49	47	47	45	44	44	48	48	48	48	49	49	45	44	43	44	49	49	48	50	49	49	48	48	47	47	44	45	43	43	44	44	44	43	44	43	43	**48**	**48**	**37**
Sat 9th	46	45	46	47	46	47	47	48	50	50	51	50	50	51	51	49	48	48	48	46	43	43	43	43	43	42	43	45	45	44	44	45	44	46	46	43	43	42	43	44	44	44	46	45	45	43	44	43	42	41	41	41	**46**	**43**	**41**
Sun 10th	35	37	37	37	39	40	40	40	39	40	40	42	41	42	43	43	43	44	44	44	44	45	45	46	46	47	48	48	46	48	46	45	45	44	43	42	41	41	40	42	42	41	44	41	41	40	41	41	42	42	43	44	**43**	**40**	**35**
Mon 11th	36	38	42	43	45	47	47	50	49	48	48	48	48	49	48	47																																							**48**	**48**	**36**
Wkday Ave.	**39**	**41**	**44**	**45**	**46**	**47**	**48**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**49**	**48**	**47**	**47**	**47**	**47**	**48**	**50**	**50**	**49**	**49**	**49**	**50**	**47**	**47**	**46**	**46**	**46**	**47**	**48**	**49**	**48**	**48**	**49**	**48**	**48**	**48**	**47**	**47**	**46**	**46**	**46**	**46**	**46**	**45**	**46**	**44**	**45**	**48**	**48**	**39**

Note: Periods of wind/rain are represented by the corresponding sell being underlined in dark blue.

Table 5.7: Difference ambient ($L_{Aeq,1h}$) (Table 5.3) and background ($L_{AF90,15min}$) (Table 5.5) sound levels – Position 1

Day (Dec. '23)	06:00	06:15	06:30	06:45	07:00	07:15	07:30	07:45	08:00	08:15	08:30	08:45	09:00	09:15	09:30	09:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00	14:15	14:30	14:45	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	18:30	18:45	Ave. (07-17)
Wed 6th																																4	3	3	3	3	2	3	3	3	3	2	2	2	3	5	4	**3**
Thu 7th	1	0	-1	-2	1	0	-1	-2	1	1	0	2	4	4	4	5	6	6	4	4	3	1	2	4	5	4	4	5	3	3	3	5	2	2	2	2	1	0	1	3	4	5	5	4	3	3	3	4	4	4	5	6	**3**
Fri 8th	3	1	0	-3	0	0	-1	-3	1	1	0	-1	3	4	4	5	5	6	6	7	5	3	2	2	4	3	3	5	7	8	7	4	0	2	0	0	3	4	3	5	4	4	5	6	5	4	5	4	3	3	3	4	**3**
Sat 9th	1	3	2	2	3	1	3	2	3	2	0	2	3	2	1	3	6	7	7	8	6	6	7	7	4	4	5	4	4	4	5	4	6	5	6	8	5	8	6	6	8	8	7	6	5	7	6	6	7	8	8	8	**5**
Sun 10th	3	1	0	0	5	3	3	3	6	6	5	4	5	5	3	2	3	1	1	1	3	2	3	2	4	2	0	1	4	3	3	4	4	7	7	8	6	7	9	7	6	6	5	6	5	6	5	4	1	2	1	1	**4**
Mon 11th	4	1	-2	-3	0	0	-2	-3	3	2	3	3	3	1	3	3	4	4	5																																				**2**
Wkday Ave.	**3**	**1**	**-1**	**-3**	**0**	**0**	**-1**	**-3**	**2**	**1**	**1**	**1**	**3**	**3**	**4**	**4**	**5**	**5**	**5**	**6**	**4**	**2**	**2**	**3**	**5**	**4**	**4**	**5**	**5**	**6**	**5**	**5**	**1**	**2**	**1**	**1**	**3**	**2**	**2**	**4**	**4**	**4**	**4**	**4**	**4**	**3**	**3**	**3**	**3**	**3**	**4**	**5**	**3**

Notes: Periods of wind/rain are represented by the corresponding sell being underlined in dark blue.
Whilst the $L_{Aeq,15min}$ level will always be at least as high as the corresponding $L_{AF90,15min}$ level, negative values are shown above due to the $L_{AF90,15min}$ values being compared to the $L_{Aeq,1h}$ (hourly) values, when the conditions on average were relatively low, and yet one or two of the 15-minute L_{AF90} levels were notably high.

5.35 The following are observed from the above data:

- The levels are generally higher at Position 1, and whilst there is likely some influence for the rain and trees, they do seem to correspond with the operational hours of the site. Which is more likely in terms of these background levels, given the constant/consistent nature of a lot of the operation of the site, but where it is not dominant.
- However, it can also be seen that the levels on the Sunday at Position 1, albeit during a period moderate winds, were similar to those during hours of operation.
- Continued overleaf/…

- The differences presented in **Table 5.7** provide an idea of how the relationship between the L_{Aeq} and L_{AF90} levels can vary, whether due to the influence from the site or otherwise, bearing in mind that the **BS 4142** assessment methodology stems around the comparison of the site sound in L_{Aeq} against the background sound in L_{AF90}. The theory being that, together with any required penalty for notable acoustic characteristics, a difference between the two can indicate the potential for noise impact. In practice, however, the background level(s) will naturally be exceeded on a regular basis, regardless of activity on the site in question; though, not necessarily by "unwanted" sources. Which is where "context" is important, as considered as part of the assessment. Notwithstanding this, when the conditions are unlikely to have been affected by the site (e.g. before and after the working day, and at the weekends), differences of around 5 dB are common.

5.36 In terms of selecting a value to use in a **BS 4142** assessment to represent the background conditions typically for comparison with the sound from the site, this could be argued to depend on whether the existing operation of the site was deemed the norm, bearing in mind its operation under similar conditions for many years. As stated in the introduction, however, it is the Environment Agency's position that the site should be assessed against conditions as if it didn't exist, but where the relevant contextual factors will be taken into account when determining the potential significance of sound emissions in practice.

5.37 Based on the average of the minimum values presented in **Tables 5.5** and **5.6**, which include the hours before and after the site operates, up until 7:00 pm, such values would appear to be no lower than 44 dB ($L_{AF90,15min}$) for Position 1 and 39 dB for Position 2. If, however, the levels just prior to, and just after, the hours of operation are considered, as being more representative to those during the hours of operation (without any influence from the site), then higher levels would be determined, **at least 46 dB for Position 1 and 43 dB for Position 2**.

5.38 In terms of the sound levels from the site, due to the influence of other sources, these cannot be determined directly from the values in **Tables 5.3** and **5.4**. At most, discounting weather-affected data, the combined sound level from the site and other sources typically would be up to around 55 dB ($L_{Aeq,1h}$). If it is assumed the site's contribution is 50%, which is anticipated to be a worst-case assumption, the equivalent sound level from the site would be 52 dB.

5.39 This is considered further in **Section 7**, following the presentation of the on-site sound level measurements.

6. ACTIVITY SOUND LEVEL MEASUREMENT

6.1 In addition to the baseline data presented above, brief measurements were undertaken in proximity to the main activities and sources. The monitoring serves a dual purpose of obtaining data that could be used in acoustic modelling and to observe how the activities were being performed and the plant operated.

6.2 Suffice to say in this latter regard, the author didn't observe anything untoward, and whilst certainly moderately high, and characterful, at times, only as to be expected. Of course, in terms of the measurements in proximity, it has to be acknowledged that the operatives were aware of the author's presence, but where, in most instances, and in terms of the main items, at least, the sound is dictated by the machine, and not by how it's operated.

6.3 The results of the on-site attended measurements are presented overleaf. Based on the estimated distances between the microphone and the nearest part of the plant/source in question, and assuming hemispherical wave radiation, the equivalent A-weighted sound power levels (L_{AW}) have been determined. In this way, the relative sound emissions from the various sources (which can depend on orientation) can be compared. It should be borne in mind that these are just estimates, however, and where a number of the measurements were influenced by other sources in the background. Whilst the perceived sound level in practice, and the potential for noise impact, will depend on factors including the nature of the sound and the duration of occurrence.

6.4 For the more general measurements, with no particular activity the focus, it's not possible to determine the sound power level, but where the data remains of use, including in terms of validating any modelling.

Table 6.1: Summary of on-site attended source measurements results

Position/Source/Description	Site photo	Dur. T (mm:ss)	$L_{Aeq,T}$ (dB)	L_{AW} (dB)	Ave. L_W (dB)
Trommel related (note: largely affected by other sources)					
2. 7m from trommel, rear corner, handlers in background		00:02:11	79	104	104
5. 7m from trommel, plus other sources in background, including handler, lorry reversing without alarm		00:01:36	80	105	
26. 8m from trommel, front corner, sound from motors, loader scraping and reversing at 8m		00:02:48	79	105	
8. 10m from trommel, other side		00:01:37	71	99	
Shredder related					
1. 5m form shredder, corner		00:01:35	89	111	110
27. 10m from shredder, other side, dominant, with handler and loader in background, constant fan type sound		00:03:12	81	109	

Table continued overleaf/...

Table 6.1: Summary of on-site attended source measurements results continued/…

Position/Source/Description	Site photo	Dur. T (mm:ss)	$L_{Aeq,T}$ (dB)	L_{AW} (dB)	Ave. L_W (dB)
Crusher related					
29. 12m from crusher, front corner, 10.16.31 loader moved forward to shovel a load, quiet		00:02:38	83	112	111
30. 9m from crusher, side, closer to the excavator (but barely audible)		00:02:13	87	114	
31. 15m from crusher front conveyor, 19m from main body	No image	00:00:43	74	107	
32. 15m from crusher, other side, slightly screened by waste		00:01:54	78	109	
Loading related (note: largely affected by other sources)					
3. Loading lorry, loading other lorry behind, 4m away, other activities in background, skip lorry reversing	 	00:03:03	78	98	N/A

Table continued overleaf/…

Table 6.1: Summary of on-site attended source measurements results continued/…

Position/Source/Description	Site photo	Dur. T (mm:ss)	$L_{Aeq,T}$ (dB)	L_{AW} (dB)	Ave. L_W (dB)
21. Loading lorry with soil and stones, pause before it started, noisy to start due to the stones (at 11.09.18) at 10m, skip lorry in background, takes a while between loads, 3 loads per lorry. Loader reverse past (11.11.39) with white alarm, much quieter when past, at 3-4m, horn blasts when done, delivery in background, plus road sweep.	No image	00:04:51	76	104	
6. Shovel loader collecting soil and stones, reversing etc. at 4-6m		00:01:17	76	98	99
7. Shovel loader collecting soil and stones, reversing etc. at 4-6m		00:01:15	77	99	
34. Loader moving waste, scraping and reversing etc. at 10-15m, generator in background, 10.34.20 scraping within measurement, and again 34.55, plus revving	No image	00:03:18	74	102	N/A
11. Skip lorry loading large bin at 7m, not too noise, whiring of engine, drove off		00:02:47	74	99	N/A
12. Regular skip lorry loading skips at 6m+, not too noisy, chatting with driver, drove off quietly		00:04:48	70	94	N/A

Table continued overleaf/…

Table 6.1: Summary of on-site attended source measurements results continued/…

Position/Source/Description	Site photo	Dur. T (mm:ss)	$L_{Aeq,T}$ (dB)	L_{AW} (dB)	Ave. L_W (dB)
Road sweeper and lorry pass-by and radio related					
23. Road sweep pass-by at 6m	No image	00:00:12	82	105	105
25. Road sweep pass-by at 4m		00:00:28	84	104	
24. Lorry pass-by at 6m		00:00:08	76	99	N/A
15. Generator at 5m, other sounds in background, reflection from walls		00:01:43	80	102	N/A
13. Radio at 7m inside workshop (some reflections), compressed air sound in background		00:01:02	66	91	N/A
External waste plant related					
16. 12m from waste plant (outside), right end		00:02:53	79	109	N/A
17. 12m from waste plant (outside), mid-section		00:01:25	78	107	N/A
18. 12m from waste plant (outside), left end, quietest, but closest to other activity, horn beeps from loader		00:02:14	74	103	N/A

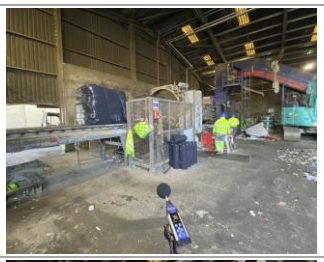
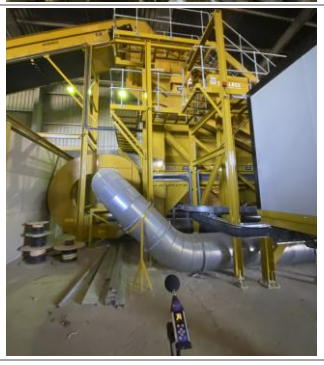
Table continued overleaf/…

Table 6.1: Summary of on-site attended source measurements results continued/…

Position/Source/Description	Site photo	Dur. T (mm:ss)	$L_{Aeq,T}$ (dB)	L_{AW} (dB)	Ave. L_W (dB)
General measurements outside					
10. Outside building with wrapper, FLT moving in and out collecting bails, with white noise reverse alarms. Rev alarm at 2-10m. 10m from building opening.		00:06:31	73	N/A	N/A
4. Trommel and shredder in background, with scrap delivery, then loader past (quiet), loader reversing, but not past meter, then loader past, collected waste, then reversed, clearing waste that has just been unloaded		00:03:13	78	N/A	N/A
20. Outside, skip lorry unloading plus handler at 9m and 9m, the handler moving material to pile, generally quiet on rest of the site, loader in background, came into scrape 11.04.24, more scraping at 10m, loading lorry in background, handler sweeping with rubber track, then drove off with white noise alarm (forwards), quietish afterwards.		00:06:12	77	N/A	N/A
28. At edge of car park, lorries driving up and down, road sweep in distance, loaders in distance, FLT loading articulated lorry with bails		00:12:22	77	N/A	N/A
A. In middle of busy area		00:08:53	76	N/A	N/A
D. Near weighbridge (with speed bump), road sweep to start, which turned before the meter at 17m, lorries queuing to leave at 5m, tall bank behind		01:02:53	68	N/A	N/A

Table continued overleaf/…

Table 6.1: Summary of on-site attended source measurements results continued/…

Position/Source/Description	Site photo	Dur. T (mm:ss)	$L_{Aeq,T}$ (dB)	L_{AW} (dB)	Ave. L_W (dB)
Inside building related					
9. Inside building with wrapper, wrapper stopped (see longer meas. with other meter)		00:00:39	80	N/A	N/A
B. Inside building, with blue handler and radio, wrapper stopped initially, then restarted		00:35:58	85	N/A	N/A
14. Inside building, at rear, new plant running, handler, other bailing machine not running, but relatively quiet when it was, radio in background	 	00:02:39	85	N/A	N/A
C. Inside building, near new plant, which is dominant in the building. Also skip lorry in building, another handler, loader in and out		00:18:00	86	N/A	N/A
19. Inside building, near fan (start of measurement before plant shut down)		00:01:34	84	N/A	N/A

6.1 Generally, the levels are as expected. The equivalent frequency data are presented overleaf in tabular and chart formats.

Table 6.2: Linear (un-weighted) sound levels in one-third octave-bands (and equivalent dBA level) from on-site attended source measurements

ID/Position/Source	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	20 kHz	dBA
2. 7m from trommel, rear corner, handlers in background	65	80	78	76	88	80	77	87	77	80	76	73	74	74	71	70	69	69	68	66	65	65	62	61	59	58	56	53	50	46	42	79
5. 7m from trommel, plus other sources in background, including handler, lorry reversing without alarm	64	75	70	71	79	83	75	85	78	73	73	72	71	71	71	75	70	69	69	67	67	66	65	64	63	60	58	55	51	48	43	80
26. 8m from trommel, front corner, sound from motors, loader scraping and reversing at 8m	62	77	74	71	79	78	77	83	77	74	73	72	71	71	71	70	70	70	69	69	66	65	63	63	61	58	56	55	53	50	46	79
8. 10m from trommel, other side	66	73	69	70	77	74	71	76	67	64	63	68	64	65	63	61	61	60	60	59	58	57	55	54	53	53	52	49	46	44	38	71
1. 5m form shredder, corner	69	72	75	76	78	78	83	90	77	77	81	86	87	83	81	78	80	79	80	77	75	73	71	69	67	65	61	58	54	49	43	89
27. 10m from shredder, other side, dominant, with handler and loader in background, constant fan type sound	66	68	72	70	73	71	78	87	73	70	72	76	76	76	75	74	72	71	70	69	66	65	62	60	58	56	52	49	46	42	36	81
29. 12m from crusher, front corner, 10.16.31 loader moved forward to shovel a load, quiet	79	66	63	62	67	68	69	72	75	81	84	73	70	76	71	71	79	74	72	71	71	70	68	69	68	62	62	61	54	50	43	83
30. 9m from crusher, side, closer to the excavator (but barely audible)	67	66	70	72	77	79	82	84	73	76	79	78	77	86	79	76	77	76	75	74	72	72	72	71	68	66	66	67	60	56	47	87
31. 15m from crusher front conveyor, 19m from main body	63	64	63	68	71	73	77	79	69	70	72	66	64	66	67	66	66	64	62	63	61	59	58	56	54	53	51	50	46	43	38	74
32. 15m from crusher, other side, slightly screened by waste	66	64	63	69	72	69	70	73	59	66	71	68	67	74	70	68	68	67	67	68	65	66	63	62	59	57	56	57	51	47	40	78
3. Loading lorry, loading other lorry behind, 4m away, other activities in background, skip lorry reversing	68	73	75	74	77	76	73	77	74	73	71	70	69	69	69	69	68	68	68	68	65	65	62	60	58	54	51	48	44	40	34	78
21. Loading lorry with soil and stones, pause before it started, noisy to start due to the stones (at 11.09.18) at 10m, skip lorry in background, takes a while between loads, 3 loads per lorry. Loader reverse past (11.11.39) with white alarm, much quieter when past, at 3-4m, horn blasts when done, delivery in background, plus road sweep.	63	66	74	71	71	77	73	72	74	70	69	69	68	71	68	68	67	67	66	66	64	63	61	59	56	53	51	49	46	42	39	76
6. Shovel loader collecting soil and stones, reversing etc. at 4-6m	65	66	67	70	73	76	71	74	69	69	64	66	65	65	66	66	67	68	68	69	63	62	60	59	54	50	49	48	46	45	43	76
7. Shovel loader collecting soil and stones, reversing etc. at 4-6m	62	65	66	70	72	74	67	71	68	69	64	66	66	65	66	66	67	69	69	70	63	62	60	58	55	51	50	49	46	44	42	77

Table continued overleaf/...

Table 6.2: Linear (un-weighted) sound levels in one-third octave-bands (and equivalent dBA level) from on-site attended source measurements continued/…

ID/Position/Source	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	20 kHz	dBA
34. Loader moving waste, scraping and reversing etc. at 10-15m, generator in background, 10.34.20 scraping within measurement, and again 34.55, plus revving	61	64	66	70	73	73	75	72	73	71	73	66	67	65	65	65	64	65	63	63	60	58	58	55	53	50	48	46	43	40	35	74
11. Skip lorry loading large bin at 7m, not too noise, whirring of engine, drove off	65	70	76	72	73	70	68	66	65	64	64	60	62	63	66	69	64	63	63	65	62	60	58	56	54	52	50	51	51	47	43	74
12. Regular skip lorry loading skips at 6m+, not too noisy, chatting with driver, drove off quietly	64	66	66	64	68	78	61	62	63	63	60	59	61	60	62	65	61	59	61	59	57	58	56	54	52	51	52	50	50	45	40	70
23. Road sweep pass-by at 6m	61	67	70	75	77	75	76	72	71	73	77	73	77	75	75	73	73	71	70	70	70	67	65	64	63	63	63	62	62	59	55	82
25. Road sweep pass-by at 4m	64	68	71	74	78	76	75	74	73	75	76	74	75	83	76	74	75	74	72	70	70	68	68	67	66	65	65	64	64	62	58	84
24. Lorry pass-by at 6m	59	72	67	73	74	72	70	70	67	68	69	65	67	69	67	68	66	65	66	66	65	63	62	60	59	59	58	58	53	49	46	76
15. Generator at 5m, other sounds in background, reflection from walls	70	88	72	73	75	86	78	75	75	77	83	77	74	75	73	71	70	68	66	65	64	64	65	65	63	59	57	54	50	45	38	80
13. Radio at 7m inside workshop (some reflections), compressed air sound in background	60	62	69	63	65	60	59	64	59	62	65	59	57	55	57	58	57	57	56	58	51	49	45	44	40	40	41	40	40	41	38	66
16. 12m from new plant (outside), right end	70	69	71	72	70	71	71	74	74	69	80	69	70	70	70	68	67	66	66	67	68	69	69	68	65	63	60	58	55	51	45	79
17. 12m from new plant (outside), mid section	73	73	71	69	70	71	71	71	70	67	75	68	67	67	67	67	66	67	65	65	66	68	68	67	65	63	60	58	54	49	43	78
18. 12m from new plant (outside), left end, quietest, but closest to other activity, horn beeps from loader	69	71	67	68	69	72	70	71	73	68	73	66	64	65	65	65	64	64	63	63	62	62	60	60	58	57	55	51	47	42	37	74
10. Outside building with wrapper, FLT moving in and out collecting bails, with white noise reverse alarms, hissing from wrapper. Rev alarm at 2-10m. 10m from building opening.	65	68	69	73	68	69	72	67	68	73	67	66	65	64	63	62	62	64	62	62	61	61	60	60	58	57	57	56	55	53	48	73
4. Trommel and shredder in background, with scrap delivery, then loader past (quiet), loader reversing, but not past meter, then loader past, collected waste, then reversed, clearing waste that has just been unloaded	65	71	70	71	78	82	78	84	77	75	74	71	70	69	69	72	69	70	68	68	65	64	62	61	58	56	52	49	45	41	36	78

Table continued overleaf/…

Table 6.2: Linear (un-weighted) sound levels in one-third octave-bands (and equivalent dBA level) from on-site attended source measurements continued/…

ID/Position/Source	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	20 kHz	dBA
20. Outside, skip lorry unloading plus handler at 9m and 9m, the handler moving material to pile, generally quiet on rest of the site, loader in background, came into scrape 11.04.24, more scraping at 10m, loading lorry in background, handler sweeping with rubber track, then drove off with white noise alarm (forwards), quietish afterwards.	64	65	67	69	71	80	73	74	78	73	70	69	69	69	68	71	67	68	67	66	65	65	63	62	61	59	58	56	53	50	44	77
28. At edge of car park, lorries driving up and down, road sweep in distance, loaders in distance, FLT loading articulated lorry with bails	65	70	72	72	73	73	73	71	70	70	69	67	69	78	69	67	67	67	64	64	64	62	60	59	57	56	54	52	51	50	46	77
A. In middle of busy area.	66	73	73	73	77	78	72	76	73	72	71	70	68	70	67	67	66	66	65	64	63	63	62	59	57	55	52	49	47	45	32	76
D. Near weighbridge (with speed bump), road sweep to start, which turned before the meter at 17m, lorries queuing to leave at 5m, tall bank behind	61	66	69	65	64	63	61	60	60	60	61	60	60	66	59	58	58	57	55	56	56	54	54	52	51	51	50	50	48	52	38	68
9. Inside building with wrapper, wrapper stopped (see longer meas. with other meter)	63	67	66	68	66	76	73	67	72	81	74	73	71	69	71	67	67	70	69	69	69	69	69	67	66	65	65	66	65	63	59	80
B. Inside building, with blue handler and radio, wrapper stopped initially, then restarted	70	74	71	79	74	77	75	74	76	81	76	77	76	75	75	74	73	74	73	73	73	74	73	72	71	70	70	70	70	70	58	85
14. Inside building, at rear, new plant running, handler, other bailing machine not running, but relatively quiet when it was, radio in background	72	82	69	70	76	81	74	74	76	76	77	78	77	76	76	77	76	76	74	74	73	73	71	68	64	60	56	52	47	41	33	85
C. Inside building, near new plant, which is dominant in the building. Also skip lorry in building, another handler, loader in and out	80	81	75	78	83	81	80	79	80	79	79	78	79	78	79	78	77	77	75	75	74	73	72	71	68	66	62	57	55	54	42	86
19. Inside building, near fan (start of measurement before plant shut down)	76	82	79	79	79	80	81	80	80	79	77	77	78	76	76	75	74	73	75	71	72	70	67	67	65	64	60	58	56	49	40	84

6.2 The above frequency data are presented in line chart form in the following figures. The measurements have been grouped and presented separately to aid viewing. Likewise, the descriptions (labels) have been simplified, whereby there's no reference to measurement distances etc.

Figure 6.1: On-site frequency data during trommel, shredder and crusher operation

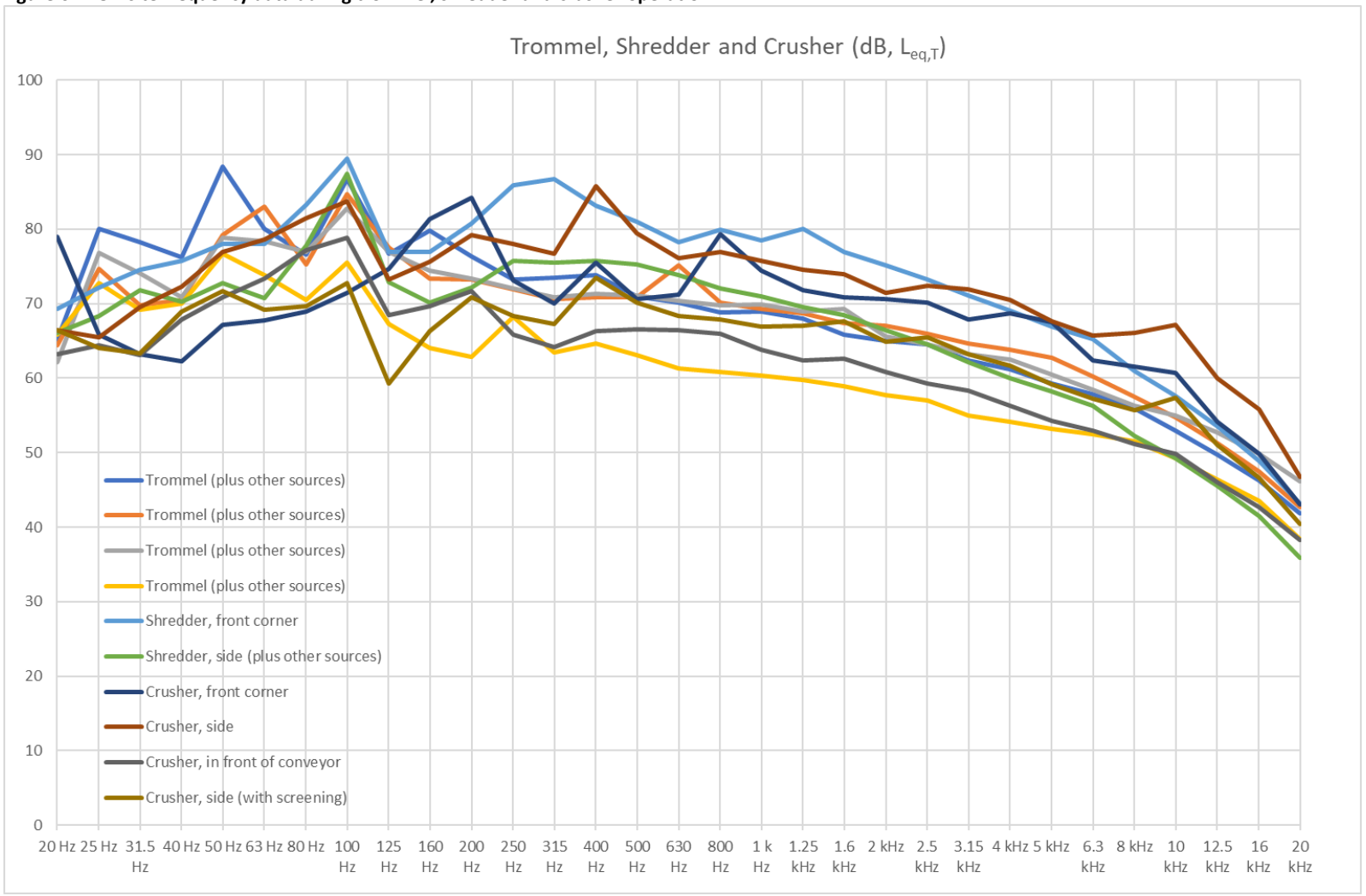


Figure 6.2: On-site frequency data during use of the shovel loader, loader of skips lorries, and road sweeper and lorry pass-bys

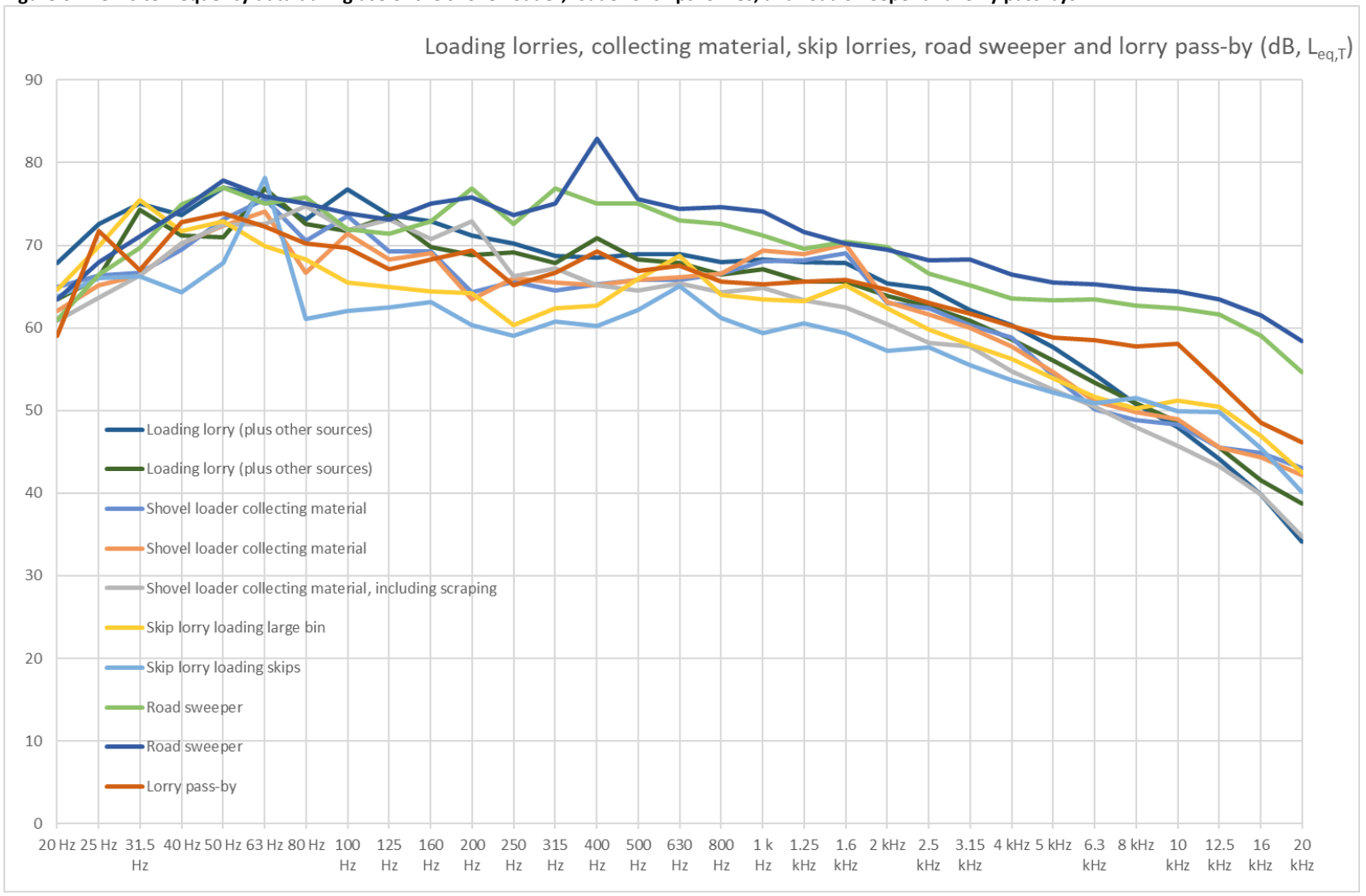


Figure 6.3: On-site frequency data during operation of the generator, a radio in the workshop, and general measurements on site and on the access road

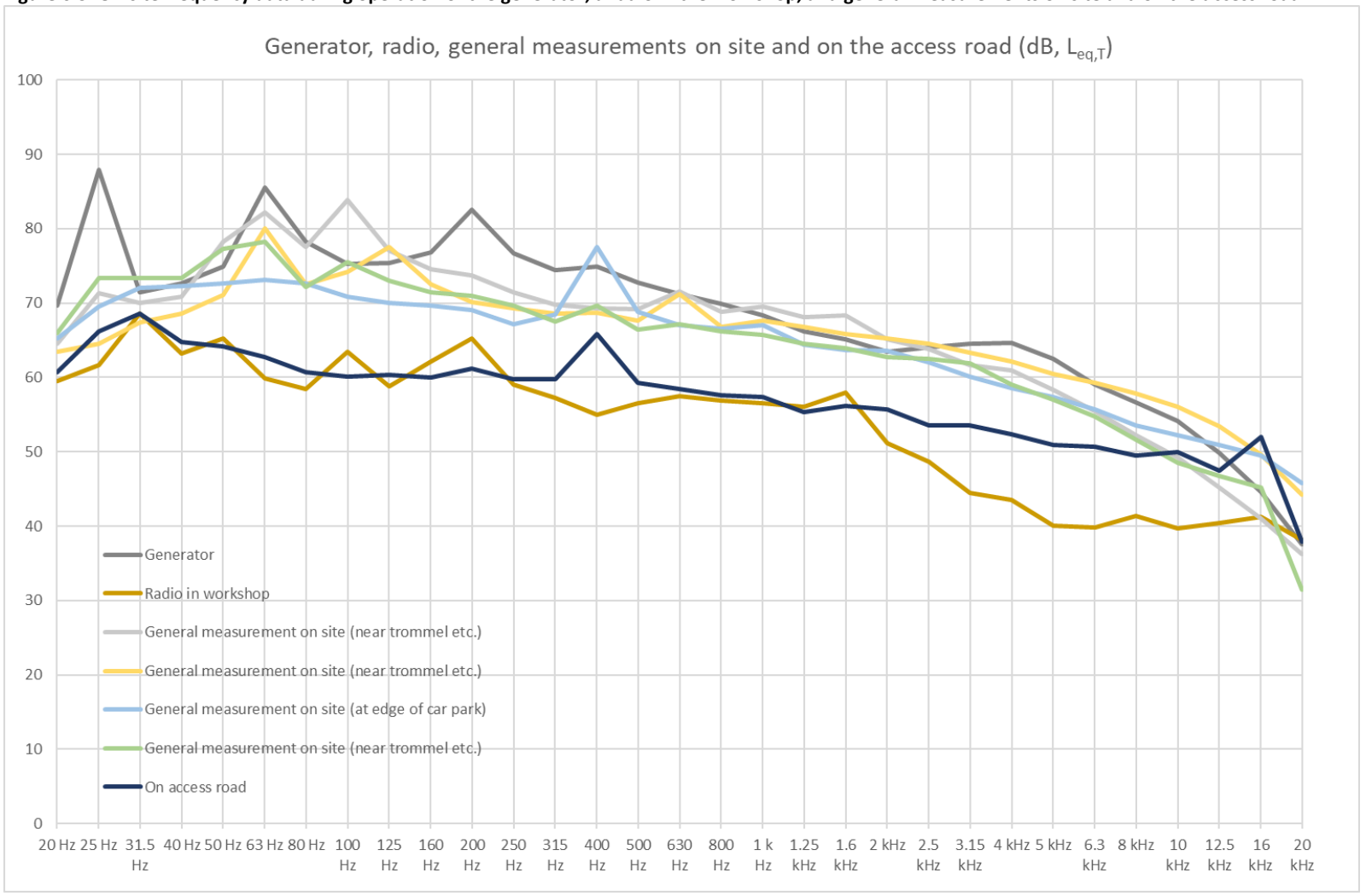


Figure 6.4: On-site frequency data during the operation of the outside elements of the waste plant and outside the building close to the bale wrapper

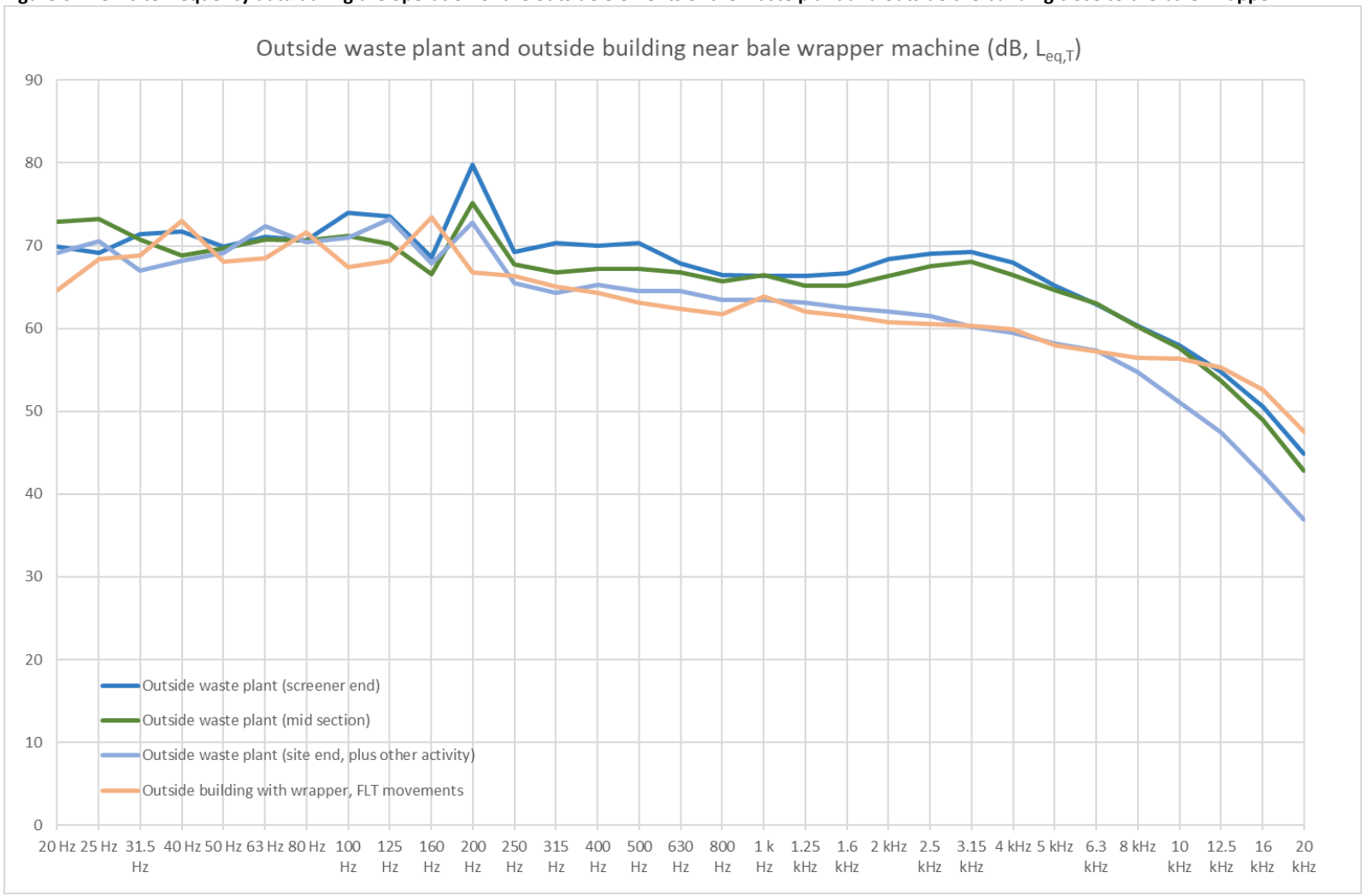
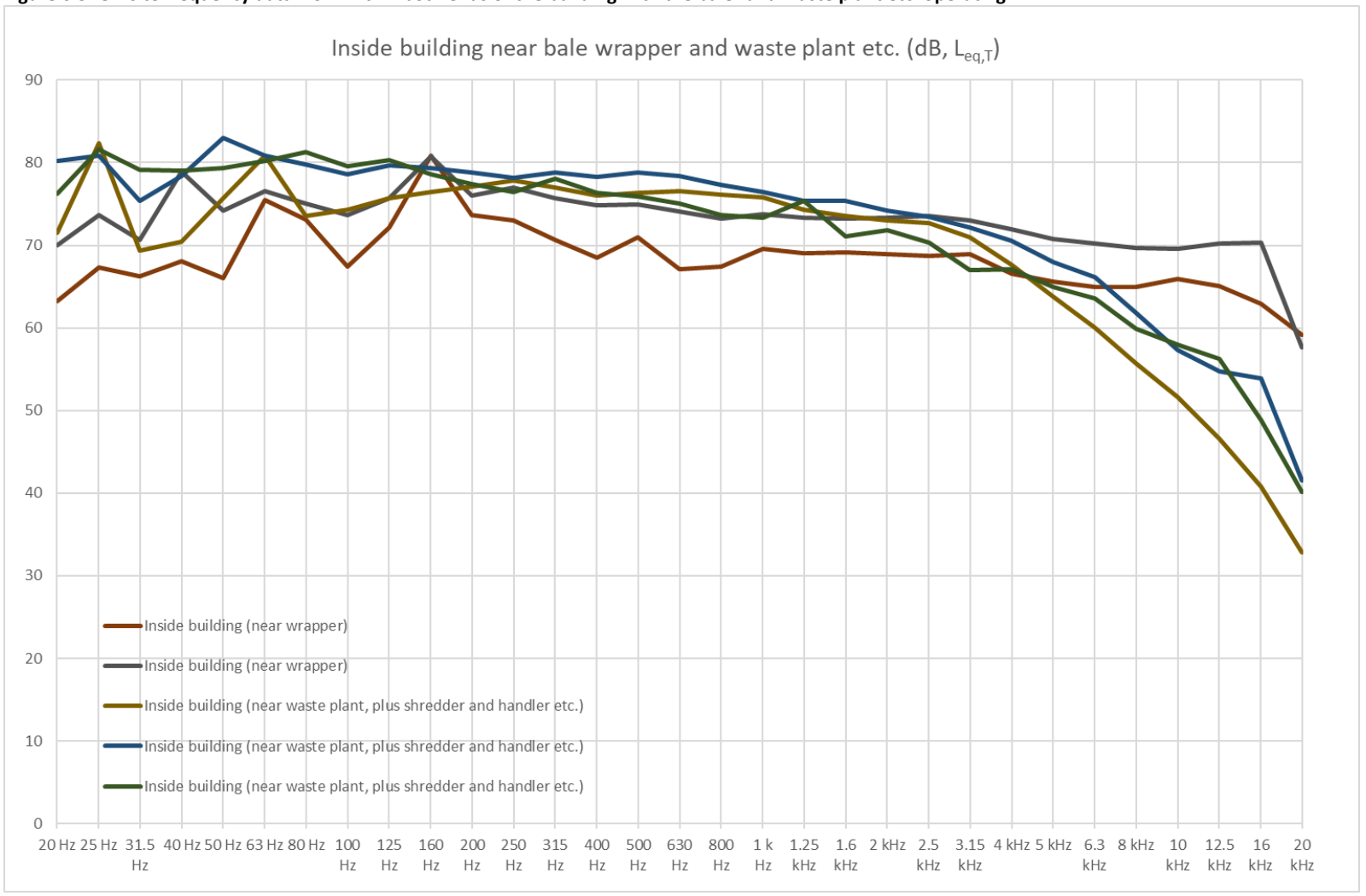


Figure 6.5: On-site frequency data from within both ends of the building with the baler and waste plant etc. operating



7. NOISE IMPACT ASSESSMENT

ACOUSTIC MODEL CONSTRUCTION

7.1 To assist with both the assessment and consideration of possible noise control measures, it has been necessary to construct a 3D acoustic model of the site and surrounding area. The proprietary software 'IMMI' has been used for this purpose.

7.2 The general topography has been determined from open-source LiDAR DTM data at 1 m resolution, as indicated in **Figure 4.2** earlier.

7.3 An aerial image from Bing Maps was imported into the model and the buildings on site digitised by hand, which were assigned as acoustically reflective and given a suitable height based on on-site observations. No other buildings were modelled as not being particularly relevant in terms of the sound propagation. All ground surrounding the site was set as acoustically soft, but where the middle and easter sections of the site, thus including the access road, were assigned as acoustically hard (i.e. reflective).

7.4 Point sources were added into the model to represent the plant and activities that are typically static, i.e. the crusher, shredder, trommel, excavator etc. Point sources were also used for the loading shovel. Whilst this does move around the site, it tends to work in discrete areas for periods of time, whereby point sources are considered to best represent the associated activity. The lorries and road sweeper movements have been modelled as line sources. Strictly, these are moving point sources, but where the software doesn't include a method for such, but where the assumption of a line source is more onerous. The elevations and openings to the main building have been modelled as area sources. The locations can be seen in the figures in the following subsection, and where the details presented in **Table 7.1** overleaf were assumed. The on-times were determined for a typical worst case one-hour period based on a combination of on-site observations and, in terms of the lorry movements, the typical number per day divided by 9.5 (hours) (i.e. 296/9.5 = 31/h).

Table 7.1: Assumed existing site activity details for the acoustic model

Activity (X, Y Coordinates)	Location	Height	Sound Power Level, L_W [1]	On-time (per worst case hour)
Generator (525983.61, 144555.00)	See **Figure 7.1**	2 m	101 [2]	100%
Crusher (525884.12, 144557.61)		2 m	110 [2]	100%
Excavator (525877.38, 144553.41)		2 m	98 [3]	50%
Shredder (525901.30, 144558.38		2 m	109 [2]	100%
Trommel (525909.76, 144547.77)		2 m	99 [2]	100%
Handler 1 (525912.64, 144553.01)		2 m	98 [3]	50%
Handler 2 (525929.07, 144559.08)		2 m	98 [3]	50%
Shovel loader x6 positions (1. 525884.07, 144548.55; 2. 525918.38, 144512.16; 3. 525915.19, 144555.41; 4. 525919.18, 144576.00; 5. 525948.06, 144542.48; 6. 525938.97, 144578.23)		1.5 m	99	5% at each position
Waste plant (screener end) (525962.17, 144500.31		4 m	105 [2]	100%
Waste plant (mid-section) (525956.52, 144511.64)		2 m	100 [2]	100%
Waste plant (non-screener end) (525950.87, 144524.73)		2 m	95 [2]	100%
Road sweeper (line source)		2 m	82 [4]	N/A
Lorry movements (line source)		1 m	74 [5]	N/A
Main building elevations (area sources)		0-6 m	55 [6]	100%
Main building front elevation openings x2		0-5 m	79 [7]	100%
Main building side elevation opening (near bale wrapping machine)		0-2.5 m	90 [8]	100%

1 Unless otherwise noted, derived from the sound pressure levels (L_P) in **Table 6.2**, with the average values used were presented. Hemispherical wave radiation assumed.
2 Adjusted to account for contribution from other sources at the time of the measurements.
3 Not measurable on site (due to dominance of other sources), and so level assumed based on data within **BS 5228-1+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise**.
4 Sound power level relative to unit length - based on the road sweeper travelling 360 m at 5 km/h 4 times in an hour.
5 Sound power level relative to unit length - based on lorries travelling 575 m at 16 km/h 31 times in an hour.
6 Sound power level relative to unit area - based on internal level of 85 dBA with a composite sound insulation of 24 dBA.
7 Sound power level relative to unit area - based on internal level of 85 dBA with a composite sound insulation of zero.
8 Sound power level relative to unit area - calibrated to measured levels externally.

7.5 Any other sources or activity were judged not to be material to the assessment.

NOISE MODEL RESULTS (CALCULATED SPECIFIC SOUND LEVELS)

7.6 The model was run to calculate the resultant single-figure, A-weighted sound pressure levels in accordance with the procedures within **ISO 9612-2:1996 Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation**, considered equivalent to the typical specific sound levels. In terms of meteorological conditions, the default settings of 10°C, 70% relative humidity and a wind speed of 3 m/s were adopted. This is standard procedure, and whereby the conditions should be representative of moderately adverse conditions in terms of sound propagation. In which case, they would more likely be less than predicted, than higher.

7.7 Calculation points were entered into the model to represent the two unattended monitoring positions, as well as one in front of the rear elevation of Ferrybridge House, at 1.5 m above ground level. The model is set such that any reflected sound from the building's façade is excluded from the 1 m distant calculation point, such that the results are equivalent to free-field levels. This means that they are directly comparable to the survey data.

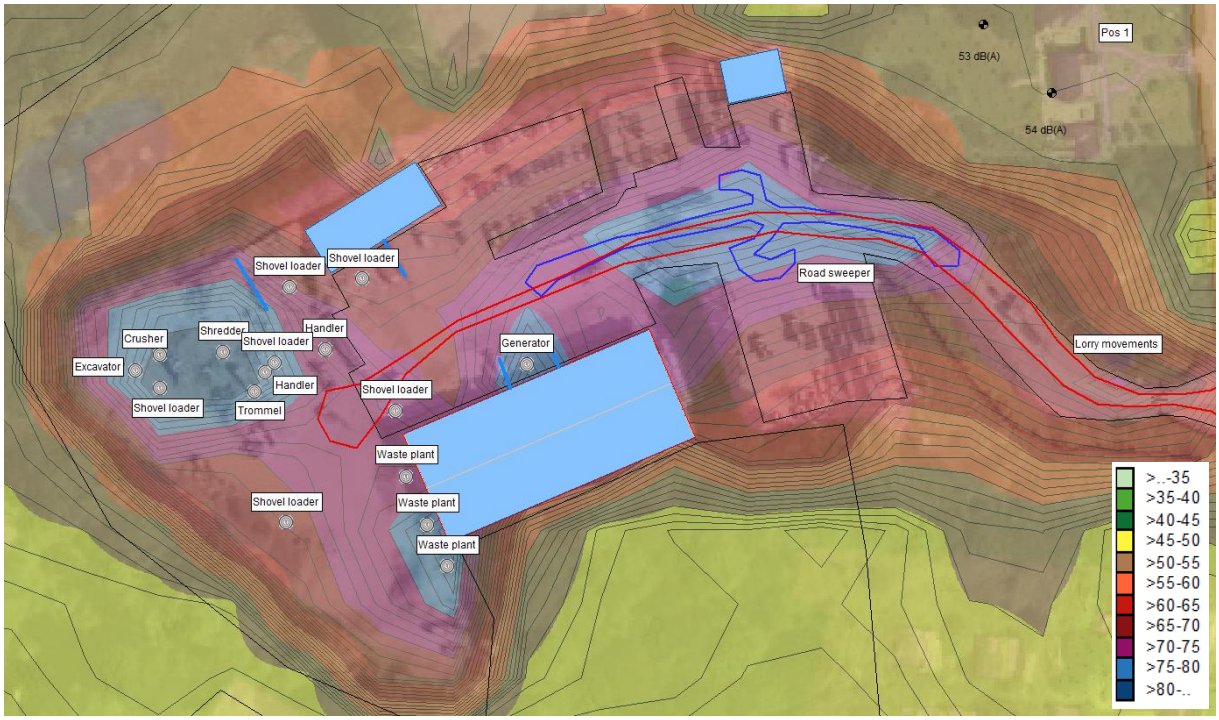
7.8 The calculated sound levels are presented in **Figures 7.2** and **7.3** overleaf, which cover the following scenarios:

- **Figure 7.2**: Existing situation 'without' the road sweeper; and
- **Figure 7.3**: Existing situation 'with' the road sweeper.

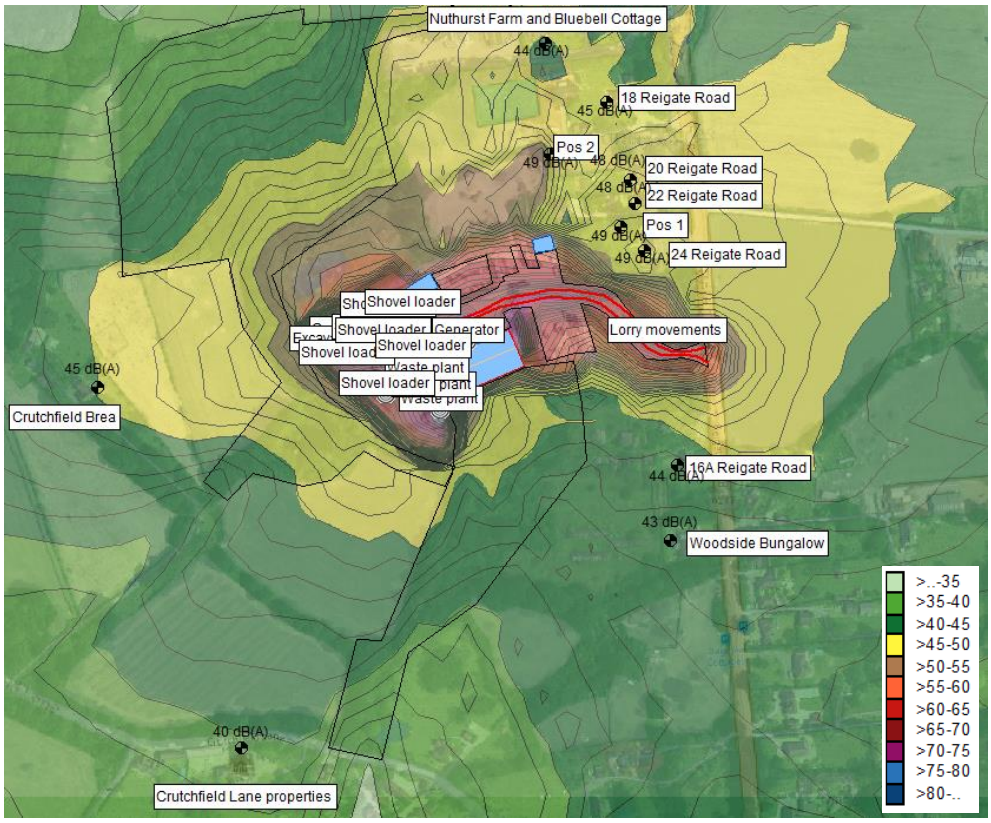
7.9 The plots show the spread of sound from the site, as well as the values at the aforementioned locations. When reviewing the contours and values, it should be borne in mind that they only show sound from the site, and not from any other background or ambient sources. They also do not contain any account for any character to the sound. This is addresses separately in order to determine the equivalent rating levels.

7.10 Since the sources and labelling are cluttered in the zoomed out versions overleaf, a zoomed in version of **Figure 7.3** (with the road sweeper) is presented first as **Figure 7.1**.

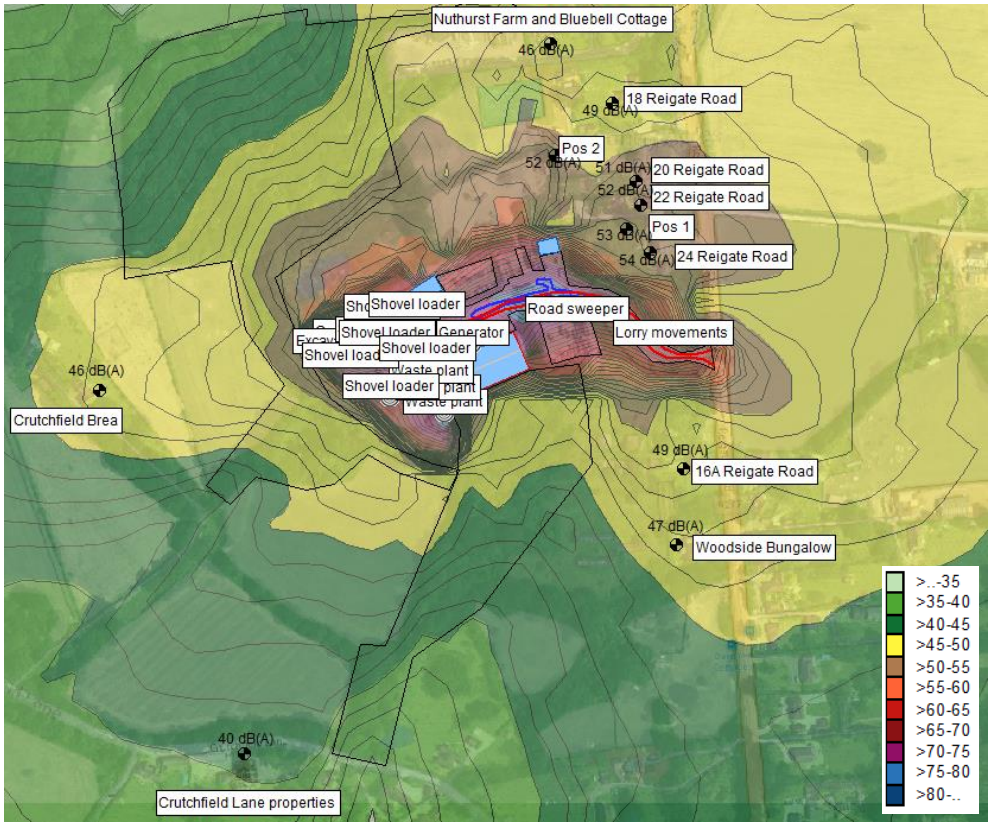
Figures 7.1: Calculated existing site sound levels <u>with</u> the road sweeper, worst-case dB $L_{Aeq,1h}$ at 1.5 m agl



Figures 7.2: Calculated existing site sound levels <u>without</u> the road sweeper, worst-case dB $L_{Aeq,1h}$ at 1.5 m agl



Figures 7.3: Calculated existing site sound levels <u>with</u> the road sweeper, worst-case dB $L_{Aeq,1h}$ at 1.5 m agl



INITIAL ESTIMATES

7.11 In terms of an assessment in accordance with BS 4142, it is a question of determining the relevant background, specific and rating levels.

7.12 From **Table 5.5**, it was concluded (following the tables) that background conditions at the nearest receptors in the absence of the site would typically be no lower than 43 dB ($L_{AF90,15min}$).

7.13 From the acoustic model, it has been determined that highest sound levels at the nearest properties could be in the region of 49 dB ($L_{Aeq,1h}$) 'without' the road sweeper and 53 dB 'with' the road sweeper. These levels are around what was expected from the survey data.

7.14 These are representative of the worst-case specific sound levels of the site, without any required character correction. In this regard, having witnessed the existing operations at the nearest property, it is considered that limited correction would apply in the absence of the road sweeper. At worst, a correction of up to 2 dB could be deemed to apply, meaning a non-road sweeper-based rating level of up to 51 dB ($L_{Ar,1h}$).

7.15 With the road sweeper, a worst-case correction of up to 4 dB for a clearly perceptible tone could be deemed to apply, meaning a road sweeper-based rating level of up to 57 dB ($L_{Ar,1h}$), which exceeds the background level by up to 14 dB. The levels are summarised in the following table for the various receptor locations.

Table 7.2: Summary of background, specific and rating levels with and without the road sweeper, dB

Receiver	Specific sound level, $L_{Aeq,1h}$ Without / with	Character correction [1] Without / with	Rating level, $L_{Ar,1h}$ Without / with	Background sound level	Difference Without / with
24 Reigate Road	49 / 53	2 / 4	51 / 57	43	8 / 14
22 Reigate Road	48 / 52	2 / 4	50 / 56	43	7 / 13
20 Reigate Road	48 / 52	2 / 4	50 / 56	43	7 / 13
18 Reigate Road	45 / 49	1 / 3	46 / 52	43	3 / 9
Nuthurst Farm and Bluebell Cottage	45 / 47	1 / 3	46 / 50	43	3 / 7
16A Reigate Road	44 / 49	1 / 2	45 / 51	43	2 / 8
Woodside Bungalow	43 / 47	1 / 2	44 / 49	43	1 / 6
Crutchfield Brae	45 / 46	2 / 2	47 / 48	39 [2]	8 / 9
Properties on Crutchfield Lane	40 / 41	0 / 1	40 / 42	39 [2]	1 / 3

1 The correction has been adjusted to reflect the range in specific sound levels.
2 Since this property/these properties are further away from Reigate Road; a lower background level has been adopted. This is anticipated to be a worst-case approach.

7.16 For a new or proposed site, the larger difference could be said to indicate a potentially significant noise impact, but where this is not the case here. This is discussed below.

CONTEXT AND FINAL APPRAISAL

7.17 In terms of context, BS 4142 recommends that consideration be given to:

1) the absolute level of sound;
2) the character and level of "residual sound" compared to the character and level of the specific sound; and
3) the sensitivity of the receptor and whether design measures are in place that secure good acoustic conditions (such as façade insulation treatment).

7.18 In terms of the first point, it is discussed following **Table 3.2** (as per the targets in **BS 8233**) that external levels of up to 55 dB ($L_{Aeq,16h}$) should be acceptable for residential amenity in noisier environments, which the calculated worst-case operational sound levels are just below. They are below the lower 50 dB threshold without assuming the road sweeper.

7.19 Assuming a reduction of 15 dB for a partially open window, the equivalent level inside would be in the order of 34-38 dB, which is below the guide threshold for dining rooms, and in the order of the threshold for living rooms and bedrooms. Levels would be lower still with windows closed and any trickle vents open.

7.20 The "residual sound" referenced in the second point relates to the ambient ($L_{Aeq,T}$) sound conditions in the absence of the site activities, where both the "level" and "character" are of interest. Typically, without the influence from the site, the residual sound levels are expected to be in the range 46 to 54 dB, as per the data in **Tables 5.3** and **5.4**. Since the calculated site levels fall within this range, this suggests the site brings a degree of change, but where, this, of course, would be the norm, and it doesn't necessarily indicate an impact.

7.21 In terms of character of the residual sound, whilst the site could be said to be the only source of "industrial" sound in the vicinity, with often fast-moving vehicles on Reigate Road, aircraft movements, dog barking and clay pigeon-type shooting in the distance, there was witnessed to be plenty of other characterful sounds.

7.22 The third point applies where the receptors in question are more or less sensitive to noise than would typically be the case. Some of the properties on Reigate Road at least are fitted with air conditioning, which would certainly be a mitigation factor. This can't be relied upon for all receptors, but where it is nonetheless considered to be a significant mitigating factor that the site has operated broadly as it does currently for a number of years, without a history of noise-related complaints. It should also be borne in mind that the site operates without encroaching into evening or night-time periods, or Saturday afternoons and Sundays.

7.23 Overall, therefore, given the existing use of the site, and with the specific sound levels typically no higher than the **BS 8233** lower threshold for external amenity, it is considered that the controlled operation of the site should not result in an adverse noise impact. Whilst, based on the wording in the **NPPF**'s **PPG-N** (see **Table B.1** of **Appendix B**), since the sound is not expected to result in a need to speak more loudly, for example, and in the absence of disturbance at night, it is considered that there should be **No Observed Adverse Effect**, whereby "Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response."

7.24 Accordingly, no specific measures are required necessarily, and it is considered that the operation of the site is in keeping with national noise policy.

7.25 Notwithstanding this, together with a separate Noise Management Plan, Noise Management Controls are presented as **Section 8**, in order to assist with keeping operational sound levels to a practicable minimum.

UNCERTAINTY

7.26 In all assessments, it is good practice to consider uncertainty, which can arise from a number of different aspects of an assessment. There is a degree of uncertainty associated with: the instrumentation itself; the use of instrumentation; the source data; the sound propagation model, where applicable; and, of course, the subjective response of recipients.

7.27 In terms of the assessment presented above, uncertainty due to instrumentation error has kept to a minimum by the use of the highest standard of field-based instrumentation, and by ensuring that all instrumentation is calibrated before and after each measurement period and is within accepted calibration intervals.

7.28 In terms of the baseline data, the management of uncertainty has included carrying out the survey over a number of days, being mindful of the weather conditions, and clearly presenting and reviewing the data.

7.29 Regarding the acoustic modelling, great care has been taken in the model's construction, with the data and assumptions regarding the existing plant items and activities being based on detailed on-site measurements and observations, with a large number of photographs and videos having been taken for reference. Whilst there is

also the sound level data at the measurement locations to go on, which is considered to indicate, if anything, the resultant sound levels are an overestimation.

7.30 Regarding subjective response, the guidance adopted for the assessment is based on the subjective response of the majority of the population, with care taken to consider relevant contextual factors.

7.31 On the basis of the above, therefore, whilst the magnitude of uncertainty cannot be quantitatively defined, it is considered that sufficient measures have been taken to minimise this to an acceptable degree.

8. BEST AVAILABLE TECHNIQUES (BAT)

8.1 At a surface level, with the use of modern plant, and with activities seemingly being well-controlled during the site visits, it would appear that the BAT approach is being followed. Whilst it should be borne in mind that the site's operational hours are limited to 07:00-17:00 weekdays and 07:00-12:00 Saturdays. This would seem reasonable under the circumstances.

8.2 It is considered that the site layout is broadly best-case in terms of noise and logistics, with the loudest plant either within the main building or furthest from the receptors, with significant physical screening.

8.3 As identified, the item that stands out the most on site is the road sweeper, both in terms of its acoustic character and proximity to the nearest receptors. It is understood that a wheel wash was used previously, but which wasn't sufficiently effective. Nevertheless, it is the author's recommendation to the applicant to consider how the use of the road sweeper could be amended to reduce sound emissions.

8.4 It might be that a quieter machine is available – which would unlikely be just because electric motor-powered road sweepers are now available, as it's not the drive motor that results in the sound in question – but where it might be that some are simply better engineered in that regard. In any case, it is presumed that it would be acceptable to avoid using the machine before 8 am, and during a fixed hour during the day, 1-2 pm, for example.

8.5 This is the only specific recommendation at this stage. See also, however, the Noise Management Plan, within which general management control measures are presented to keep sound emissions to a practicable minimum.

9. CONCLUSION AND NEXT STEPS

9.1 As far as the author has been able to determine, the site is adopting BAT and operating appropriately with respect to sound emissions, and where there is no reason to suspect this won't be the case in the future.

9.2 Furthermore, whilst the site can be audible at the nearest dwelling, this is only to be expected for such a site, which has operated for a significant period of time without a history of complaints, whilst providing a much-needed service to a wide area and employment to a large number of staff.

9.3 The author does not believe that, in context, the resultant sounds and associated sound levels should result in a significant noise impact. Indeed, in terms of the wording in the **NPPF**'s **PPG-N** (see **Table B.1** of **Appendix B**), it is considered that there should be **No Observed Adverse Effect**, whereby "Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life."

9.4 In light of the above, the only specific step recommended by the author is for the applicant to explore the means of limiting the sound from the required road cleaning, which could be by avoiding certain periods in the first instance, and investigating if quieter machines or methods are available to achieve an acceptable outcome.

9.5 Notwithstanding this step, it is considered that noise should not be a barrier to the permit being granted as proposed.

APPENDIX A: GLOSSARY

Sound can be measured by a sound level meter or other measuring system. Noise is related to a human response, and is routinely described as unwanted sound, or sound that is considered undesirable or disruptive.[3] Care has been taken in this document to use the most relevant of these terms (whereby 'sound' is used predominantly); however, in most reference documents, and, indeed, generally, 'sound' and 'noise' are used interchangeably. Consequently, just because the term 'noise' is used, doesn't necessarily mean a negative effect exits or will occur, and the context of the accompanying text should be taken into account.

Normal human hearing is able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble), and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain).

The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify sound in a manner that approximates the response of the human ear, a weighting mechanism is used, which reduces the importance of lower and higher frequencies in a similar manner to human hearing.

The weighting mechanism that best corresponds to the response of the human ear (though not necessarily perfectly) is the 'A'-weighting scale. This is widely used for environmental sound measurement, and the levels are denoted as dBA, dB(A) or L_{Aeq}, L_{Amax} etc. according to the metric being measured or determined (see the Definitions below).

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dBA increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dBA is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. Where other changes occur (associated with the change in sound level), such as additional vehicle movements on a road, which can be seen, then these may result in changes in sound level being more noticeable than they might otherwise be.

Further to such visual clues, and any other non-acoustical factors that affect people's response (such personal characteristics, and social, residential or environmental factors), the subjective response to a sound is dependent not only upon the sound pressure level and component frequencies, but also its intermittency. Consequently, various metrics have been developed to try and correlate people's attitudes to different sounds with the sound level and its fluctuations. The metrics used in this document, as per the relevant guidance, are defined below.

- Airborne sound: Sound that reaches the point of interest by propagation through air.
- Ambient sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
- 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.
- Background sound: Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location.
- BAT (best available techniques). Means the available techniques that are the best for preventing or minimising emissions and impacts on the environment. The European Commission (EC) produces Best Available Technique reference documents or BREF notes. They contain BAT for some installations. The Environment Agency (EA) see BAT as equivalent to the term 'appropriate measures', whilst is could also be seen as equivalent to best practicable means (BPM), defined in Part III of the **Environmental Protection Act 1990** as: "'Practicable' means reasonably practicable in terms of local conditions/circumstances, the current state of technical knowledge, and financial implications."
- Calibration: The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The

[3] Taken from the Foreword to BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

calibration of the system should also be checked in the field using a portable calibrator before and after each short term measurements, and periodically for longer term monitoring.

- Class 1: The Class of a sound level meter describes its accuracy as defined by the relevant international standards – Class 1 is more accurate than Class 2. The older standard **IEC 60651** referred to the grade as "Type", whereas the new standard **IEC 61672** refers to it as the "Class". The most accurate meters used in the field (as opposed to a laboratory) are Class 1. Class 2 meters can be used in some instances; however, Chris Wood Acoustics use Class 1 meters by default, as required by **BS 4142**, for example.
- Context: The circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood. When considering context, pertinent factors include: the absolute level of sound; the character and level of the residual sound compared to the character and level of the specific sound; evidence on human response to the sound; and the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.
- 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 20 µPa.
- Dwelling: A building used for living purposes. A mobile home used for permanent living should be included in an assessment. If calculations are being conducted for compensation purposes, then some mobile homes are dealt with under the Highways Noise Payments and Moveable Homes Regulations.
- EA (Environment Agency): The EA is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs (Defra). Within England, it is responsible for: regulating major industry and waste; treatment of contaminated land; water quality and resources; fisheries; inland river, estuary and harbour navigations; conservation and ecology; and managing the risk of flooding from main rivers, reservoirs, estuaries and the sea.
- Façade/ Façade Level: At a distance of 1 m in front of a large sound reflecting object such as a building façade. According to **BS 8233:2014**, "Façade level measurements of L_{pA} are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the façade." The Calculation of Road Traffic Noise (1988) uses 2.5 dB, whilst **BS 5228-1:2009+A1:2014** recommends 3 dB. Owing to the latter examples, together with other historical documents, it is more usual to apply 3 dB.
- Fast time-weighting (F): Averaging time used in sound level meters. Defined in BS EN 61672-2:2013 Electroacoustics. Sound level meters. Pattern evaluation tests.
- Hertz (Hz): The unit of Frequency or Pitch of a sound. One hertz equals one cycle per second. 1 kHz = 1000 Hz, 2 kHz = 2000 Hz, etc.
- IOA: The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration. It was formed in 1974 from the amalgamation of the Acoustics Group of the Institute of Physics and the British Acoustical Society (a daughter society of the Institution of Mechanical Engineers). It is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels.
- $L_{AF90,T}$: The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time fast time-weighting (F). Generally used to describe the 'background' sound conditions.
- L_{AFmax}: The maximum A-weighted sound pressure level during a given time period. L_{max} is sometimes used for the assessment of occasional loud sounds, which may have little effect on the overall L_{eq} noise level, but could still affect the sound environment. Unless described otherwise, it is measured using the fast time-weighting (F).

- $L_{eq,T}$: A sound level index called the equivalent continuous sound 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. Where the value is A-weighted, is will be presented '$L_{Aeq,T}$' or 'dBA $L_{eq,T}$', otherwise is should be an un-weighted (or linear) value.
- Octave/ octave band: Band of frequencies in which the upper limit of the band is twice the frequency of the lower limit. E.g. the 1000 Hz octave band contains sound energy at all frequencies from 707 to 1414 Hz.
- Point source: A sound source whose dimensions are small compared to the propagation distances involved. Due to the Inverse Square Law, the sound level pressure level decreases by 6 dB every time the distance between the measurement point and the source is doubled.
- Rating Level, $L_{Ar,Tr}$: The equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$, see also Specific Level) of the sound, plus any adjustment for the characteristic features of the sound.
- Residual Sound: ambient sound remaining at the assessment location when the specific sound source is suppressed (or absent) to such a degree that it does not contribute to the ambient sound.
- Sound power level, L_W: Sound power measured on a decibel scale, relative to a reference value of 10 12 W.
- Sound pressure level (sound level), L_p: The sound level is the sound pressure relative to a standard reference pressure of 20 µPa ($20x10^{-6}$ Pascals) on a decibel scale.
- Specific sound level, $L_s = L_{Aeq,Tr}$: Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.
- Specific sound source: Sound source being assessed.

APPENDIX B: NATIONAL NOISE POLICY

B.1 NATIONAL POLICY

The national policy of relevance comprises the Noise Policy Statement for England (NPSE, 2010) and the online National Planning Policy Framework (NPPF, regularly updated) and its associated planning practice guidance on "Noise" (also regularly updated). The guidance is necessarily generic and primarily geared towards local authorities preparing their own policies and associated guidance. The documents are described below.

B.1.1 Noise Policy Statement for England (NPSE, 2010)

The **NPSE** is the Government's overarching statement on noise policy for England, and applies to all forms of noise other than occupational noise, setting out the long-term vision of Government noise policy, which is to:

> "Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

Which is supported by the following noise policy aims:

> "Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
>
> - Avoid significant adverse impacts on health and quality of life;
> - Mitigate and minimise adverse impacts on health and quality of life; and
> - Where possible, contribute to the improvement of health and quality of life."

When discussing the meaning of "significant adverse" and "adverse" within an "**Explanatory Note**", the **NPSE** states:

> "There are two established concepts from toxicology that are currently being applied to noise impacts for example, by the World Health Organisation. They are
>
> "NOEL – No Observed Effect Level - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
>
> "LOAEL – Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected."

To which the **NPSE** added the following related concept:

> "SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur."

The **Explanatory Note** continues:

> "It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

The **NPSE** concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three aims listed above. Logically, it starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL, when "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development." The final aim envisages proactive management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development.

B.1.2 National Planning Policy Framework (NPPF, 2021)

First published in 2012, and most recently updated in July 2021, the **NPPF** sets out the Government's planning policies for England, and how these are expected to be applied. Noise is referenced within the **NPPF** as follows. These are effectively the **NPPF**'s policies on noise.

> "174. Planning policies and decisions should contribute to and enhance the natural and local environments by:
>
> "…e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans…"

> "185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:
>
> "a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[60]…"

Reference number 60 of the above quotation points to the **Explanatory Note** to the **NPSE** (see above).

The following policy is also relevant to noise.

> "187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

As mentioned above, the Government has published accompanying web-based planning guidance for a number of categories, including noise (see below).

B.1.3 NPPF Planning Practice Guidance, Noise (PPG-N, 2019)

Following initial release in 2014, the **planning practice guidance** now forms part of the **NPPF**, referred to as "relevant planning practice guidance", which includes guidance on the category of "Noise". The guidance is often referred to as **PPG-Noise**, **PPG-N** or **PPG(N)**.

In keeping with the **NPSE** and **NPPF**, no values (in dB) are presented; however, plenty of guidance is provided as to the issues to consider in assessing noise and determining suitable thresholds. Whilst, in keeping with this report, reference is made to **BS 8233**.

A "noise exposure hierarchy table" is provided, which summarises the noise exposure hierarchy based on the likely average response of those affected, and is reproduced below. It includes "examples of outcomes" relevant to the NOEL, LOAEL and SOAEL effect thresholds described in the **NPSE**. These outcomes are in descriptive form; there is no numerical definition of the NOEL, LOAEL and SOAEL.

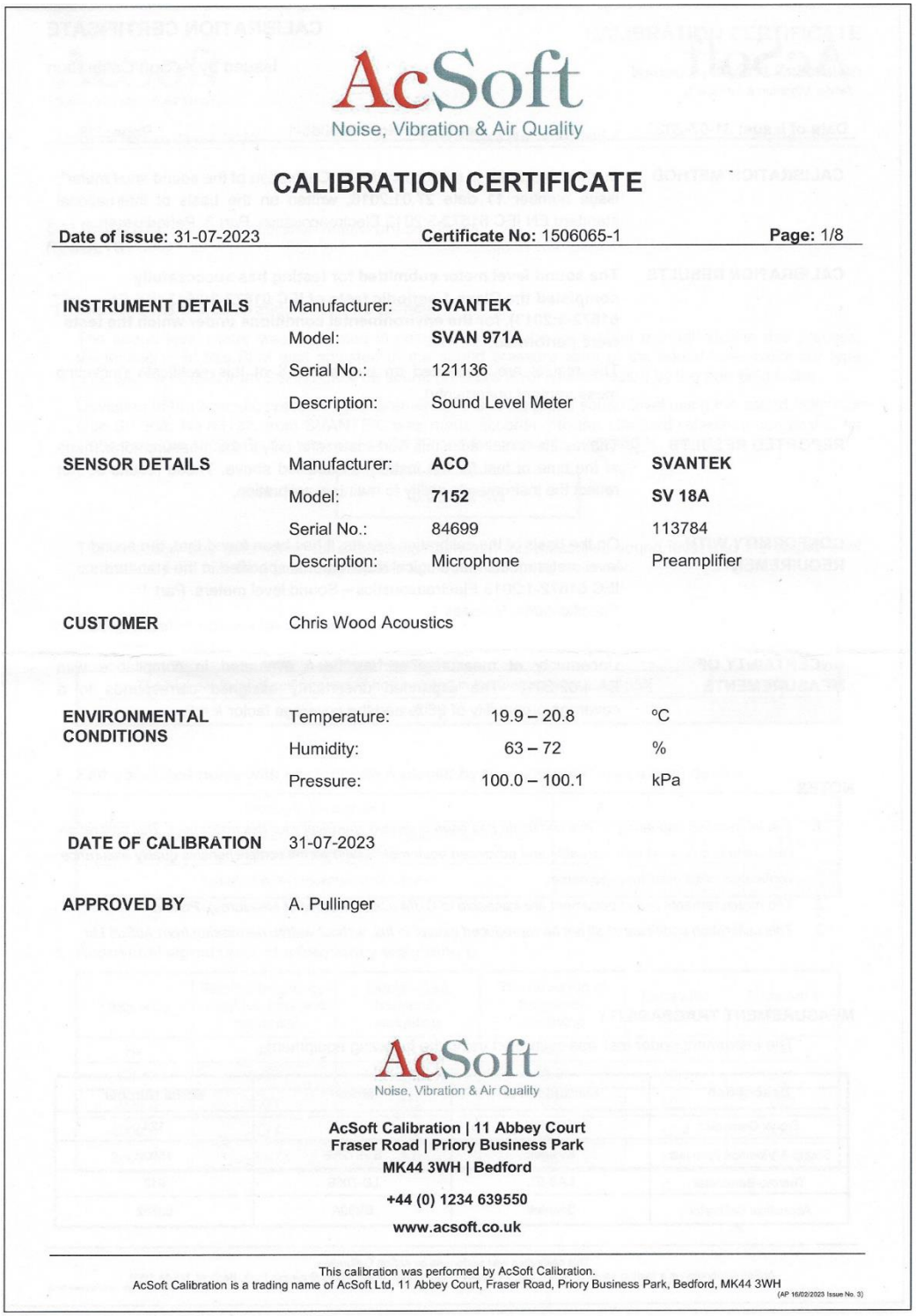
Table B.1: Noise exposure hierarchy table (as per PPG-N)

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

It is left to other guidance documents (e.g. BS 4142 and BS 8233) and professional opinion to determine thresholds where required.

APPENDIX C: CALIBRATION CERTIFICATES

SLM1



AcSoft
Noise, Vibration & Air Quality

CALIBRATION CERTIFICATE

Date of issue: 31-07-2023 **Certificate No:** 1506065-1 **Page:** 1/8

INSTRUMENT DETAILS	Manufacturer:	**SVANTEK**	
	Model:	**SVAN 971A**	
	Serial No.:	121136	
	Description:	Sound Level Meter	
SENSOR DETAILS	Manufacturer:	**ACO**	**SVANTEK**
	Model:	**7152**	**SV 18A**
	Serial No.:	84699	113784
	Description:	Microphone	Preamplifier
CUSTOMER	Chris Wood Acoustics		
ENVIRONMENTAL CONDITIONS	Temperature:	19.9 – 20.8	°C
	Humidity:	63 – 72	%
	Pressure:	100.0 – 100.1	kPa
DATE OF CALIBRATION	31-07-2023		
APPROVED BY	A. Pullinger		

AcSoft
Noise, Vibration & Air Quality

AcSoft Calibration | 11 Abbey Court
Fraser Road | Priory Business Park
MK44 3WH | Bedford

+44 (0) 1234 639550

www.acsoft.co.uk

This calibration was performed by AcSoft Calibration.
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(AP 16/02/2023 Issue No. 3)

Note: First page presented only for brevity

SLM2

AcSoft
Noise, Vibration & Air Quality

CALIBRATION CERTIFICATE

Date of issue: 31-07-2023 **Certificate No:** 1506065-2 **Page:** 1/8

INSTRUMENT DETAILS	Manufacturer:	**SVANTEK**	
	Model:	**SVAN 971A**	
	Serial No.:	131651	
	Description:	Sound Level Meter	
SENSOR DETAILS	Manufacturer:	**ACO**	**SVANTEK**
	Model:	**7152**	**SV 18**
	Serial No.:	85537	139344
	Description:	Microphone	Preamplifier
CUSTOMER	Chris Wood Acoustics		
ENVIRONMENTAL CONDITIONS	Temperature:	18.9 – 20.4	°C
	Humidity:	63 – 75	%
	Pressure:	100.0 – 100.1	kPa
DATE OF CALIBRATION	31-07-2023		
APPROVED BY	A. Pullinger		

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Noise, Vibration & Air Quality

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(AP 16/02/2023 Issue No. 3)

Note: First page presented only for brevity

Calibrator

SVANTEK

ISO9001 certified

Sound Level Calibrator

Type: **SV33B** Serial No: **140764**

Calibration Chart

Sound pressure level: **114.06 dB** (THD: **0.34 %**)

Frequency: **1000 Hz**

Short term level stability: 0.05 dB
Frequency stability: 0.01 %

Measurement conditions
Temperature: **23 °C**
Relative humidity: **49 %**
Ambient pressure: **997 hPa**

Reference conditions
Temperature: 23.0 °C
Relative humidity: 50 %
Ambient pressure: 1013.2 hPa

CONFORMITY & TEST DECLARATION

The stated level is valid at reference conditions.
Measured according to IEC 60942:2003.
The stated level is relative to 20 µPa .

The level is traceable to GUM (Central Office of Measures, Poland) with a calculated uncertainty less then ± 0.15 dB (2*sd).

Calibration specialist : .....

Date : 2023-06-26

APPENDIX D: UNATTENDED SURVEY RESULTS

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Wed 06/12/2023	12:30	76	55	47			
Wed 06/12/2023	12:45	65	54	46			
Wed 06/12/2023	13:00	74	54	46			
Wed 06/12/2023	13:15	66	54	46			
Wed 06/12/2023	13:30	63	56	49			
Wed 06/12/2023	13:45	65	50	44			
Wed 06/12/2023	14:00	67	54	47			
Wed 06/12/2023	14:15	60	50	47	88	55	41
Wed 06/12/2023	14:30	64	51	48	69	52	44
Wed 06/12/2023	14:45	61	52	49	64	48	45
Wed 06/12/2023	15:00	73	53	48	63	48	46
Wed 06/12/2023	15:15	57	51	49	63	48	45
Wed 06/12/2023	15:30	66	52	49	62	48	45
Wed 06/12/2023	15:45	60	52	49	73	49	45
Wed 06/12/2023	16:00	68	52	49	66	48	46
Wed 06/12/2023	16:15	60	52	50	64	49	46
Wed 06/12/2023	16:30	63	52	49	65	49	46
Wed 06/12/2023	16:45	64	53	49	62	48	46
Wed 06/12/2023	17:00	58	52	49	62	48	46
Wed 06/12/2023	17:15	64	52	49	57	49	46
Wed 06/12/2023	17:30	65	52	50	53	48	46
Wed 06/12/2023	17:45	62	52	50	62	49	46
Wed 06/12/2023	18:00	62	53	50	57	47	46
Wed 06/12/2023	18:15	64	52	49	62	48	46
Wed 06/12/2023	18:30	61	51	47	61	49	46
Wed 06/12/2023	18:45	60	51	48	59	49	46
Wed 06/12/2023	19:00	60	51	47	74	49	44
Wed 06/12/2023	19:15	59	50	46	55	47	45
Wed 06/12/2023	19:30	61	51	47	57	48	45
Wed 06/12/2023	19:45	60	51	46	63	47	43
Wed 06/12/2023	20:00	63	51	47	59	47	43
Wed 06/12/2023	20:15	58	50	46	60	47	44
Wed 06/12/2023	20:30	58	49	46	60	47	43
Wed 06/12/2023	20:45	62	49	45	57	46	43
Wed 06/12/2023	21:00	62	50	45	57	45	43
Wed 06/12/2023	21:15	58	47	43	57	45	42
Wed 06/12/2023	21:30	60	48	43	56	45	41
Wed 06/12/2023	21:45	58	49	44	53	42	39
Wed 06/12/2023	22:00	59	47	43	55	45	40
Wed 06/12/2023	22:15	64	49	45	61	46	41
Wed 06/12/2023	22:30	75	50	44	50	43	39

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Wed 06/12/2023	22:45	77	56	44	54	44	41
Wed 06/12/2023	23:00	60	48	44	62	45	40
Wed 06/12/2023	23:15	58	48	44	76	53	40
Wed 06/12/2023	23:30	57	47	42	58	43	40
Wed 06/12/2023	23:45	61	48	43	56	43	39
Thu 07/12/2023	00:00	57	47	42	70	44	38
Thu 07/12/2023	00:15	58	47	41	69	48	38
Thu 07/12/2023	00:30	58	46	39	53	42	38
Thu 07/12/2023	00:45	59	48	39	52	41	37
Thu 07/12/2023	01:00	64	50	43	49	39	35
Thu 07/12/2023	01:15	62	46	39	55	42	35
Thu 07/12/2023	01:30	61	45	38	72	45	38
Thu 07/12/2023	01:45	58	45	39	52	40	35
Thu 07/12/2023	02:00	61	45	38	52	39	34
Thu 07/12/2023	02:15	58	44	38	49	39	34
Thu 07/12/2023	02:30	60	44	38	48	38	34
Thu 07/12/2023	02:45	60	46	38	48	38	33
Thu 07/12/2023	03:00	65	45	39	49	38	33
Thu 07/12/2023	03:15	61	46	41	52	39	34
Thu 07/12/2023	03:30	61	47	40	52	39	33
Thu 07/12/2023	03:45	59	47	40	52	40	34
Thu 07/12/2023	04:00	60	47	41	50	40	35
Thu 07/12/2023	04:15	61	50	45	50	41	35
Thu 07/12/2023	04:30	61	51	44	47	40	35
Thu 07/12/2023	04:45	60	50	44	52	43	38
Thu 07/12/2023	05:00	62	49	41	56	43	39
Thu 07/12/2023	05:15	59	48	42	57	43	38
Thu 07/12/2023	05:30	58	49	43	52	42	37
Thu 07/12/2023	05:45	58	51	46	49	42	38
Thu 07/12/2023	06:00	60	51	48	51	43	40
Thu 07/12/2023	06:15	61	53	49	53	45	42
Thu 07/12/2023	06:30	61	53	50	58	46	43
Thu 07/12/2023	06:45	64	55	51	61	48	45
Thu 07/12/2023	07:00	64	55	52	57	49	46
Thu 07/12/2023	07:15	68	55	53	61	50	48
Thu 07/12/2023	07:30	66	56	54	63	50	47
Thu 07/12/2023	07:45	66	58	55	72	53	48
Thu 07/12/2023	08:00	71	58	55	68	52	49
Thu 07/12/2023	08:15	68	58	55	62	53	50
Thu 07/12/2023	08:30	75	59	56	61	53	51
Thu 07/12/2023	08:45	79	59	54	63	54	52

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Thu 07/12/2023	09:00	68	58	54	74	57	52
Thu 07/12/2023	09:15	72	57	54	80	57	52
Thu 07/12/2023	09:30	79	58	54	73	54	52
Thu 07/12/2023	09:45	77	57	53	71	54	51
Thu 07/12/2023	10:00	60	54	51	69	53	51
Thu 07/12/2023	10:15	72	55	51	63	52	49
Thu 07/12/2023	10:30	73	57	53	57	49	47
Thu 07/12/2023	10:45	63	56	53	73	51	47
Thu 07/12/2023	11:00	65	56	53	69	54	49
Thu 07/12/2023	11:15	66	58	55	62	53	50
Thu 07/12/2023	11:30	69	59	54	63	53	51
Thu 07/12/2023	11:45	66	55	52	65	54	51
Thu 07/12/2023	12:00	66	56	52	70	55	51
Thu 07/12/2023	12:15	69	56	53	61	53	50
Thu 07/12/2023	12:30	69	56	53	66	53	50
Thu 07/12/2023	12:45	64	55	52	65	52	49
Thu 07/12/2023	13:00	65	55	53	78	52	50
Thu 07/12/2023	13:15	71	56	53	72	52	49
Thu 07/12/2023	13:30	71	55	53	58	51	49
Thu 07/12/2023	13:45	69	55	51	61	51	49
Thu 07/12/2023	14:00	63	55	53	76	52	47
Thu 07/12/2023	14:15	81	56	53	62	50	47
Thu 07/12/2023	14:30	63	55	53	66	51	48
Thu 07/12/2023	14:45	68	57	53	61	52	50
Thu 07/12/2023	15:00	73	59	55	60	52	50
Thu 07/12/2023	15:15	64	58	56	59	52	50
Thu 07/12/2023	15:30	65	57	55	67	54	51
Thu 07/12/2023	15:45	68	57	53	66	55	53
Thu 07/12/2023	16:00	65	57	54	59	54	51
Thu 07/12/2023	16:15	67	56	53	63	53	51
Thu 07/12/2023	16:30	64	57	53	62	53	51
Thu 07/12/2023	16:45	65	57	54	60	52	50
Thu 07/12/2023	17:00	64	57	54	60	52	49
Thu 07/12/2023	17:15	65	57	54	58	51	49
Thu 07/12/2023	17:30	66	57	54	62	51	48
Thu 07/12/2023	17:45	65	56	53	59	51	48
Thu 07/12/2023	18:00	63	56	53	59	50	47
Thu 07/12/2023	18:15	63	56	53	57	49	47
Thu 07/12/2023	18:30	64	55	52	60	50	47
Thu 07/12/2023	18:45	64	55	51	71	50	47
Thu 07/12/2023	19:00	68	56	53	65	49	46

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Thu 07/12/2023	19:15	63	55	51	59	49	46
Thu 07/12/2023	19:30	65	55	51	62	50	47
Thu 07/12/2023	19:45	67	54	50	58	48	45
Thu 07/12/2023	20:00	63	54	49	60	48	45
Thu 07/12/2023	20:15	65	53	49	60	48	45
Thu 07/12/2023	20:30	64	51	47	60	49	44
Thu 07/12/2023	20:45	62	51	47	64	48	43
Thu 07/12/2023	21:00	64	50	46	62	45	41
Thu 07/12/2023	21:15	65	50	45	61	46	41
Thu 07/12/2023	21:30	65	48	42	56	45	41
Thu 07/12/2023	21:45	64	46	39	54	44	40
Thu 07/12/2023	22:00	64	48	42	58	44	38
Thu 07/12/2023	22:15	59	48	42	56	42	37
Thu 07/12/2023	22:30	63	45	40	60	43	38
Thu 07/12/2023	22:45	64	45	38	61	45	36
Thu 07/12/2023	23:00	61	45	38	52	39	34
Thu 07/12/2023	23:15	65	44	37	53	38	34
Thu 07/12/2023	23:30	62	45	36	53	40	35
Thu 07/12/2023	23:45	59	43	36	53	38	32
Fri 08/12/2023	00:00	59	43	35	59	42	31
Fri 08/12/2023	00:15	64	42	34	48	37	30
Fri 08/12/2023	00:30	61	41	34	52	38	30
Fri 08/12/2023	00:45	58	42	34	51	35	27
Fri 08/12/2023	01:00	58	41	34	47	34	28
Fri 08/12/2023	01:15	63	44	34	50	34	27
Fri 08/12/2023	01:30	64	42	34	56	37	26
Fri 08/12/2023	01:45	59	40	33	59	41	27
Fri 08/12/2023	02:00	60	40	33	44	33	27
Fri 08/12/2023	02:15	62	42	34	45	32	25
Fri 08/12/2023	02:30	60	39	33	54	33	24
Fri 08/12/2023	02:45	62	41	33	50	35	27
Fri 08/12/2023	03:00	54	39	34	42	31	25
Fri 08/12/2023	03:15	66	40	34	50	33	25
Fri 08/12/2023	03:30	60	43	35	43	30	24
Fri 08/12/2023	03:45	60	40	34	51	35	27
Fri 08/12/2023	04:00	58	42	35	51	34	28
Fri 08/12/2023	04:15	59	43	35	50	33	26
Fri 08/12/2023	04:30	56	42	35	45	33	27
Fri 08/12/2023	04:45	65	43	36	49	36	28
Fri 08/12/2023	05:00	57	45	36	52	36	29
Fri 08/12/2023	05:15	65	45	37	46	36	29

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Fri 08/12/2023	05:30	72	45	38	48	38	30
Fri 08/12/2023	05:45	59	47	43	52	38	32
Fri 08/12/2023	06:00	65	48	43	71	40	32
Fri 08/12/2023	06:15	61	50	45	46	40	37
Fri 08/12/2023	06:30	61	51	46	60	44	37
Fri 08/12/2023	06:45	63	52	49	63	48	41
Fri 08/12/2023	07:00	64	52	50	62	48	43
Fri 08/12/2023	07:15	68	53	50	61	48	44
Fri 08/12/2023	07:30	65	54	51	74	54	45
Fri 08/12/2023	07:45	65	56	53	65	49	46
Fri 08/12/2023	08:00	66	57	53	73	53	48
Fri 08/12/2023	08:15	63	55	53	64	53	50
Fri 08/12/2023	08:30	73	56	54	72	54	51
Fri 08/12/2023	08:45	63	57	55	66	52	50
Fri 08/12/2023	09:00	69	56	54	69	52	51
Fri 08/12/2023	09:15	69	55	53	64	53	51
Fri 08/12/2023	09:30	65	55	53	72	54	51
Fri 08/12/2023	09:45	68	56	52	61	52	51
Fri 08/12/2023	10:00	64	54	51	66	51	49
Fri 08/12/2023	10:15	68	52	50	67	53	49
Fri 08/12/2023	10:30	67	55	50	64	51	47
Fri 08/12/2023	10:45	70	53	49	59	49	47
Fri 08/12/2023	11:00	67	52	49	62	51	45
Fri 08/12/2023	11:15	68	54	51	68	51	44
Fri 08/12/2023	11:30	70	56	52	64	48	44
Fri 08/12/2023	11:45	72	56	52	66	51	48
Fri 08/12/2023	12:00	71	57	51	68	53	48
Fri 08/12/2023	12:15	68	56	52	68	53	48
Fri 08/12/2023	12:30	66	54	52	67	54	48
Fri 08/12/2023	12:45	69	53	50	67	52	49
Fri 08/12/2023	13:00	64	52	48	64	52	49
Fri 08/12/2023	13:15	61	50	47	66	51	45
Fri 08/12/2023	13:30	62	51	48	72	48	44
Fri 08/12/2023	13:45	62	54	51	55	46	43
Fri 08/12/2023	14:00	64	54	52	85	54	44
Fri 08/12/2023	14:15	67	53	50	61	52	49
Fri 08/12/2023	14:30	74	55	52	64	53	49
Fri 08/12/2023	14:45	71	55	52	67	52	48
Fri 08/12/2023	15:00	70	55	52	69	54	50
Fri 08/12/2023	15:15	69	54	51	68	52	49
Fri 08/12/2023	15:30	64	54	52	66	52	49

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Fri 08/12/2023	15:45	63	53	50	71	52	48
Fri 08/12/2023	16:00	68	54	50	75	58	48
Fri 08/12/2023	16:15	64	53	50	75	55	47
Fri 08/12/2023	16:30	57	51	49	67	52	47
Fri 08/12/2023	16:45	58	51	48	59	48	44
Fri 08/12/2023	17:00	64	51	48	57	48	45
Fri 08/12/2023	17:15	62	52	49	60	46	43
Fri 08/12/2023	17:30	67	52	48	61	46	43
Fri 08/12/2023	17:45	62	52	49	61	47	44
Fri 08/12/2023	18:00	62	52	49	69	49	44
Fri 08/12/2023	18:15	60	52	49	66	48	44
Fri 08/12/2023	18:30	64	52	49	60	48	43
Fri 08/12/2023	18:45	61	51	48	63	47	44
Fri 08/12/2023	19:00	63	51	48	67	49	43
Fri 08/12/2023	19:15	64	51	47	61	47	43
Fri 08/12/2023	19:30	62	51	47	64	47	43
Fri 08/12/2023	19:45	61	50	46	67	48	42
Fri 08/12/2023	20:00	63	50	44	65	49	42
Fri 08/12/2023	20:15	67	50	46	63	46	41
Fri 08/12/2023	20:30	61	50	45	61	46	39
Fri 08/12/2023	20:45	64	51	45	61	47	40
Fri 08/12/2023	21:00	60	50	44	64	47	40
Fri 08/12/2023	21:15	74	51	44	65	49	40
Fri 08/12/2023	21:30	61	47	41	59	48	39
Fri 08/12/2023	21:45	64	49	44	67	50	39
Fri 08/12/2023	22:00	64	48	43	67	42	36
Fri 08/12/2023	22:15	74	51	43	69	47	39
Fri 08/12/2023	22:30	56	46	42	61	43	38
Fri 08/12/2023	22:45	59	46	41	63	45	38
Fri 08/12/2023	23:00	57	48	44	48	39	37
Fri 08/12/2023	23:15	62	48	44	54	39	36
Fri 08/12/2023	23:30	55	48	43	52	42	39
Fri 08/12/2023	23:45	54	47	43	57	42	38
Sat 09/12/2023	00:00	53	45	39	52	41	37
Sat 09/12/2023	00:15	53	45	39	50	40	37
Sat 09/12/2023	00:30	63	47	40	45	38	33
Sat 09/12/2023	00:45	59	46	39	54	38	34
Sat 09/12/2023	01:00	56	46	41	48	39	35
Sat 09/12/2023	01:15	59	44	37	52	39	34
Sat 09/12/2023	01:30	54	43	37	52	40	35
Sat 09/12/2023	01:45	66	46	39	48	37	32

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Sat 09/12/2023	02:00	57	43	37	45	36	31
Sat 09/12/2023	02:15	56	44	37	57	40	34
Sat 09/12/2023	02:30	62	44	36	47	36	31
Sat 09/12/2023	02:45	58	44	38	45	37	32
Sat 09/12/2023	03:00	60	46	40	53	37	29
Sat 09/12/2023	03:15	58	45	39	47	36	31
Sat 09/12/2023	03:30	60	48	43	55	38	32
Sat 09/12/2023	03:45	66	49	44	74	41	33
Sat 09/12/2023	04:00	66	49	45	47	38	34
Sat 09/12/2023	04:15	64	51	45	56	39	35
Sat 09/12/2023	04:30	62	51	46	54	40	36
Sat 09/12/2023	04:45	64	51	46	58	41	37
Sat 09/12/2023	05:00	66	53	49	54	41	37
Sat 09/12/2023	05:15	67	54	51	62	44	38
Sat 09/12/2023	05:30	66	55	50	64	47	40
Sat 09/12/2023	05:45	65	57	54	60	44	41
Sat 09/12/2023	06:00	73	57	54	63	47	42
Sat 09/12/2023	06:15	65	55	52	64	48	44
Sat 09/12/2023	06:30	65	56	53	64	50	46
Sat 09/12/2023	06:45	65	57	53	62	49	45
Sat 09/12/2023	07:00	67	57	53	61	50	46
Sat 09/12/2023	07:15	69	58	55	67	51	47
Sat 09/12/2023	07:30	73	57	53	64	51	46
Sat 09/12/2023	07:45	67	57	54	61	50	47
Sat 09/12/2023	08:00	67	57	54	69	50	47
Sat 09/12/2023	08:15	66	58	55	61	51	48
Sat 09/12/2023	08:30	69	60	57	67	54	50
Sat 09/12/2023	08:45	65	58	55	62	53	50
Sat 09/12/2023	09:00	72	58	55	62	53	51
Sat 09/12/2023	09:15	69	59	56	70	54	50
Sat 09/12/2023	09:30	67	59	57	64	53	50
Sat 09/12/2023	09:45	69	58	55	66	54	51
Sat 09/12/2023	10:00	67	56	53	62	53	51
Sat 09/12/2023	10:15	69	55	52	65	53	49
Sat 09/12/2023	10:30	65	54	52	58	51	48
Sat 09/12/2023	10:45	67	54	51	71	52	48
Sat 09/12/2023	11:00	65	52	49	61	50	48
Sat 09/12/2023	11:15	66	53	49	67	51	46
Sat 09/12/2023	11:30	65	52	48	67	48	43
Sat 09/12/2023	11:45	69	52	48	68	49	43
Sat 09/12/2023	12:00	67	51	48	63	48	43

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Sat 09/12/2023	12:15	66	52	48	63	49	43
Sat 09/12/2023	12:30	68	51	47	69	49	43
Sat 09/12/2023	12:45	80	53	48	67	49	42
Sat 09/12/2023	13:00	74	53	48	73	49	43
Sat 09/12/2023	13:15	69	53	48	67	52	45
Sat 09/12/2023	13:30	68	52	47	70	52	45
Sat 09/12/2023	13:45	72	55	48	73	52	44
Sat 09/12/2023	14:00	64	52	47	67	50	44
Sat 09/12/2023	14:15	66	54	48	69	55	45
Sat 09/12/2023	14:30	70	53	47	69	49	44
Sat 09/12/2023	14:45	66	50	45	72	53	46
Sat 09/12/2023	15:00	87	58	47	66	52	46
Sat 09/12/2023	15:15	71	49	44	71	49	43
Sat 09/12/2023	15:30	61	50	46	76	52	43
Sat 09/12/2023	15:45	65	52	46	67	48	42
Sat 09/12/2023	16:00	70	51	46	74	54	43
Sat 09/12/2023	16:15	66	51	46	64	50	44
Sat 09/12/2023	16:30	64	52	47	62	50	44
Sat 09/12/2023	16:45	69	53	48	69	51	44
Sat 09/12/2023	17:00	66	53	47	62	51	46
Sat 09/12/2023	17:15	64	51	45	65	51	45
Sat 09/12/2023	17:30	64	52	46	75	52	45
Sat 09/12/2023	17:45	62	51	46	68	50	43
Sat 09/12/2023	18:00	68	53	45	63	49	44
Sat 09/12/2023	18:15	68	50	44	68	48	43
Sat 09/12/2023	18:30	62	48	44	70	52	42
Sat 09/12/2023	18:45	63	50	44	65	50	41
Sat 09/12/2023	19:00	56	47	43	57	45	41
Sat 09/12/2023	19:15	64	49	44	60	48	41
Sat 09/12/2023	19:30	75	54	45	74	47	39
Sat 09/12/2023	19:45	66	52	47	65	48	41
Sat 09/12/2023	20:00	69	52	46	65	51	43
Sat 09/12/2023	20:15	63	52	45	63	51	44
Sat 09/12/2023	20:30	66	52	45	70	53	43
Sat 09/12/2023	20:45	60	49	45	64	52	43
Sat 09/12/2023	21:00	65	53	45	68	52	44
Sat 09/12/2023	21:15	73	54	45	62	50	42
Sat 09/12/2023	21:30	62	49	43	73	55	42
Sat 09/12/2023	21:45	67	50	44	69	54	43
Sat 09/12/2023	22:00	63	51	45	60	47	41
Sat 09/12/2023	22:15	59	48	43	63	48	42

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Sat 09/12/2023	22:30	62	49	44	69	51	43
Sat 09/12/2023	22:45	74	53	44	64	48	41
Sat 09/12/2023	23:00	57	47	42	66	50	42
Sat 09/12/2023	23:15	61	48	41	69	52	42
Sat 09/12/2023	23:30	61	47	41	66	46	40
Sat 09/12/2023	23:45	61	49	42	58	46	39
Sun 10/12/2023	00:00	59	46	40	61	47	39
Sun 10/12/2023	00:15	68	49	42	62	48	41
Sun 10/12/2023	00:30	59	46	39	61	47	38
Sun 10/12/2023	00:45	62	47	39	64	48	40
Sun 10/12/2023	01:00	56	46	40	60	45	37
Sun 10/12/2023	01:15	59	46	39	62	48	39
Sun 10/12/2023	01:30	56	44	36	61	46	37
Sun 10/12/2023	01:45	56	42	36	61	44	36
Sun 10/12/2023	02:00	54	40	36	61	42	32
Sun 10/12/2023	02:15	55	40	34	58	39	33
Sun 10/12/2023	02:30	55	40	35	50	37	33
Sun 10/12/2023	02:45	52	38	34	52	38	30
Sun 10/12/2023	03:00	58	40	35	48	36	30
Sun 10/12/2023	03:15	58	42	36	54	38	28
Sun 10/12/2023	03:30	52	40	34	63	38	31
Sun 10/12/2023	03:45	54	39	33	57	42	33
Sun 10/12/2023	04:00	55	39	33	56	42	30
Sun 10/12/2023	04:15	54	38	34	48	34	29
Sun 10/12/2023	04:30	65	42	34	74	42	29
Sun 10/12/2023	04:45	61	42	33	50	36	29
Sun 10/12/2023	05:00	54	38	33	51	36	30
Sun 10/12/2023	05:15	52	40	34	55	37	28
Sun 10/12/2023	05:30	53	40	35	43	32	28
Sun 10/12/2023	05:45	54	41	35	45	33	29
Sun 10/12/2023	06:00	60	43	37	57	36	29
Sun 10/12/2023	06:15	65	46	39	48	36	31
Sun 10/12/2023	06:30	65	46	40	65	44	35
Sun 10/12/2023	06:45	67	48	40	59	43	37
Sun 10/12/2023	07:00	59	47	41	65	45	37
Sun 10/12/2023	07:15	67	50	43	70	48	37
Sun 10/12/2023	07:30	69	49	43	63	47	39
Sun 10/12/2023	07:45	70	50	43	67	50	40
Sun 10/12/2023	08:00	80	51	43	63	47	40
Sun 10/12/2023	08:15	64	50	43	67	48	40
Sun 10/12/2023	08:30	77	52	44	67	46	39

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Sun 10/12/2023	08:45	60	49	45	68	50	40
Sun 10/12/2023	09:00	68	50	46	66	47	40
Sun 10/12/2023	09:15	65	51	46	65	47	42
Sun 10/12/2023	09:30	61	52	48	72	51	41
Sun 10/12/2023	09:45	61	52	49	71	49	42
Sun 10/12/2023	10:00	64	52	48	75	52	43
Sun 10/12/2023	10:15	68	53	50	73	51	43
Sun 10/12/2023	10:30	63	54	50	67	50	43
Sun 10/12/2023	10:45	67	54	50	60	49	44
Sun 10/12/2023	11:00	62	54	50	62	48	44
Sun 10/12/2023	11:15	62	54	51	67	50	44
Sun 10/12/2023	11:30	65	55	50	64	49	44
Sun 10/12/2023	11:45	68	55	51	63	48	45
Sun 10/12/2023	12:00	67	54	50	67	51	45
Sun 10/12/2023	12:15	62	55	52	67	52	46
Sun 10/12/2023	12:30	68	58	54	62	50	46
Sun 10/12/2023	12:45	67	56	53	60	50	47
Sun 10/12/2023	13:00	67	56	52	64	52	48
Sun 10/12/2023	13:15	70	56	53	65	52	48
Sun 10/12/2023	13:30	67	56	53	61	50	46
Sun 10/12/2023	13:45	69	54	52	65	51	48
Sun 10/12/2023	14:00	70	55	51	66	51	46
Sun 10/12/2023	14:15	69	52	48	58	48	45
Sun 10/12/2023	14:30	66	51	48	66	49	45
Sun 10/12/2023	14:45	68	50	47	60	48	44
Sun 10/12/2023	15:00	64	50	46	67	48	43
Sun 10/12/2023	15:15	70	52	45	62	46	42
Sun 10/12/2023	15:30	65	50	43	64	47	41
Sun 10/12/2023	15:45	66	50	45	69	51	41
Sun 10/12/2023	16:00	60	49	45	65	48	40
Sun 10/12/2023	16:15	70	50	45	69	49	42
Sun 10/12/2023	16:30	67	52	46	64	48	42
Sun 10/12/2023	16:45	63	50	45	64	48	41
Sun 10/12/2023	17:00	63	49	45	72	51	44
Sun 10/12/2023	17:15	61	48	44	60	46	41
Sun 10/12/2023	17:30	63	49	45	67	48	41
Sun 10/12/2023	17:45	57	50	46	58	45	40
Sun 10/12/2023	18:00	61	51	48	74	48	41
Sun 10/12/2023	18:15	57	50	47	67	47	41
Sun 10/12/2023	18:30	65	51	48	64	47	42
Sun 10/12/2023	18:45	68	52	48	68	45	42

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Sun 10/12/2023	19:00	59	51	48	59	46	43
Sun 10/12/2023	19:15	61	51	48	63	48	44
Sun 10/12/2023	19:30	58	51	48	62	47	43
Sun 10/12/2023	19:45	73	53	49	65	47	43
Sun 10/12/2023	20:00	67	51	48	68	46	43
Sun 10/12/2023	20:15	58	51	48	68	51	44
Sun 10/12/2023	20:30	65	52	48	64	48	43
Sun 10/12/2023	20:45	62	51	47	69	48	43
Sun 10/12/2023	21:00	69	52	47	65	50	44
Sun 10/12/2023	21:15	66	52	48	70	50	44
Sun 10/12/2023	21:30	65	51	45	66	50	43
Sun 10/12/2023	21:45	63	51	44	71	53	44
Sun 10/12/2023	22:00	74	54	46	69	51	41
Sun 10/12/2023	22:15	57	50	47	64	50	43
Sun 10/12/2023	22:30	64	51	45	65	51	43
Sun 10/12/2023	22:45	68	53	46	65	50	43
Sun 10/12/2023	23:00	59	50	45	59	49	42
Sun 10/12/2023	23:15	60	49	44	69	52	43
Sun 10/12/2023	23:30	62	50	43	61	49	43
Sun 10/12/2023	23:45	62	49	44	62	49	41
Mon 11/12/2023	00:00	61	50	44	69	53	41
Mon 11/12/2023	00:15	60	48	41	61	49	41
Mon 11/12/2023	00:30	58	47	40	66	52	42
Mon 11/12/2023	00:45	63	48	42	58	46	38
Mon 11/12/2023	01:00	63	49	43	66	46	35
Mon 11/12/2023	01:15	62	47	41	68	53	40
Mon 11/12/2023	01:30	64	48	41	64	50	41
Mon 11/12/2023	01:45	60	46	38	60	47	38
Mon 11/12/2023	02:00	60	45	38	60	46	39
Mon 11/12/2023	02:15	68	49	39	63	49	37
Mon 11/12/2023	02:30	61	46	37	63	47	36
Mon 11/12/2023	02:45	63	48	36	63	50	38
Mon 11/12/2023	03:00	56	42	37	65	47	35
Mon 11/12/2023	03:15	64	45	36	66	49	35
Mon 11/12/2023	03:30	56	42	36	60	43	34
Mon 11/12/2023	03:45	64	45	37	60	45	35
Mon 11/12/2023	04:00	58	42	35	57	43	34
Mon 11/12/2023	04:15	56	42	36	59	43	34
Mon 11/12/2023	04:30	54	42	36	60	44	32
Mon 11/12/2023	04:45	55	42	35	52	38	32
Mon 11/12/2023	05:00	56	42	36	53	39	33

Date	Time (Start)	Position 1			Position 2		
		L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB	L_{AFmax}, dB	$L_{Aeq,15min}$, dB	$L_{AF90,15min}$, dB
Mon 11/12/2023	05:15	59	43	37	53	39	33
Mon 11/12/2023	05:30	53	43	37	58	41	32
Mon 11/12/2023	05:45	55	44	40	51	38	34
Mon 11/12/2023	06:00	56	45	39	54	38	35
Mon 11/12/2023	06:15	64	48	42	53	40	35
Mon 11/12/2023	06:30	65	50	45	58	41	36
Mon 11/12/2023	06:45	69	51	46	70	45	38
Mon 11/12/2023	07:00	68	52	49	64	48	42
Mon 11/12/2023	07:15	70	53	49	69	49	43
Mon 11/12/2023	07:30	65	54	51	66	49	45
Mon 11/12/2023	07:45	69	55	52	69	54	47
Mon 11/12/2023	08:00	67	54	51	75	53	47
Mon 11/12/2023	08:15	66	55	52	67	53	50
Mon 11/12/2023	08:30	62	53	51	69	52	49
Mon 11/12/2023	08:45	64	53	51	63	51	48
Mon 11/12/2023	09:00	65	57	51	68	51	48
Mon 11/12/2023	09:15	66	57	53	67	52	48
Mon 11/12/2023	09:30	62	54	51	64	51	48
Mon 11/12/2023	09:45	64	55	51	68	52	49
Mon 11/12/2023	10:00	63	52	49	69	51	48
Mon 11/12/2023	10:15	69	53	49	74	51	47
Mon 11/12/2023	10:30	83	52	45			
Mon 11/12/2023	10:45	72	56	49			

REPORT END