

REPORT TITLE:

Wythenshawe Sports Hub – Baseline Noise Survey & Noise Impact Assessment

CLIENT DETAILS:

Etec Group

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Document Status and Revision Schedule

Issue/Revision	Description/Comments	Date	Prepared by	Approved by
First Issue	Checked & Authorised	28/02/25	PY	MJ
RevA	Report fully updated to reflect final Stage 3 drawing pack issued 30/06/25	04/07/25	PY	MJ
RevB	Redline boundary plan updated in figures 2, 15 & 17. Section 5.2 text updated	17/09/25	PY	MJ

1. Introduction

- 1.1.1. Pace Consult was appointed and instructed by Etec Group to complete a baseline noise survey and noise impact assessment for the proposed Wythenshawe Sports Hub development.
- 1.1.2. The site is located within the existing wider Wythenshawe Park site, adjacent to Wythenshawe Road, Manchester. Figure 1 overleaf shows the existing site layout.
- 1.1.3. The proposed development consists of the construction of a mixed leisure and healthcare facility, with associated outdoor sports areas. Figure 2 overleaf shows the proposed site layout, while figures 3 & 4 show the proposed internal layouts.
- 1.1.4. As the development is located near to residential dwellings there is a potential for noise to impact to arise from development. Noise break-in to the proposed buildings from existing environmental noise sources should also be considered.
- 1.1.5. In order to assess and mitigate these potential impacts a baseline noise survey and noise impact assessment has been completed by Pace Consult Ltd as part of the planning stage design. This technical report details the site, assessment criteria, baseline survey and noise impact assessment.
- 1.1.6. This technical report details the baseline noise survey & noise impact assessment. The baseline survey has been completed following the guidance of BS4142:2014 + A1:2019 *Methods for rating and assessing industrial and commercial units* & BS 7445: *Description & Measurement of Environmental Noise (Parts 1-3)*.
- 1.1.7. Noise impact on the site has been assessed following the guidance of BS 8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings*. Where appropriate, guidance will also be taken from BB93 *Acoustic Design of Schools 2015* & Health Technical Memorandum 08:01 *Acoustics*.
- 1.1.8. Assessment of the potential noise impacts arising from the site have been completed following the guidance of BS BS4142:2014 + A1:2019 *Methods for rating and assessing industrial and commercial units*. Guidance has also been taken from and the World Health Organisation (WHO) '*Guidelines for Community Noise*' and the IEMA *Guidelines for Environmental Noise Impact Assessment*.

Figure 1: Existing Site Plan

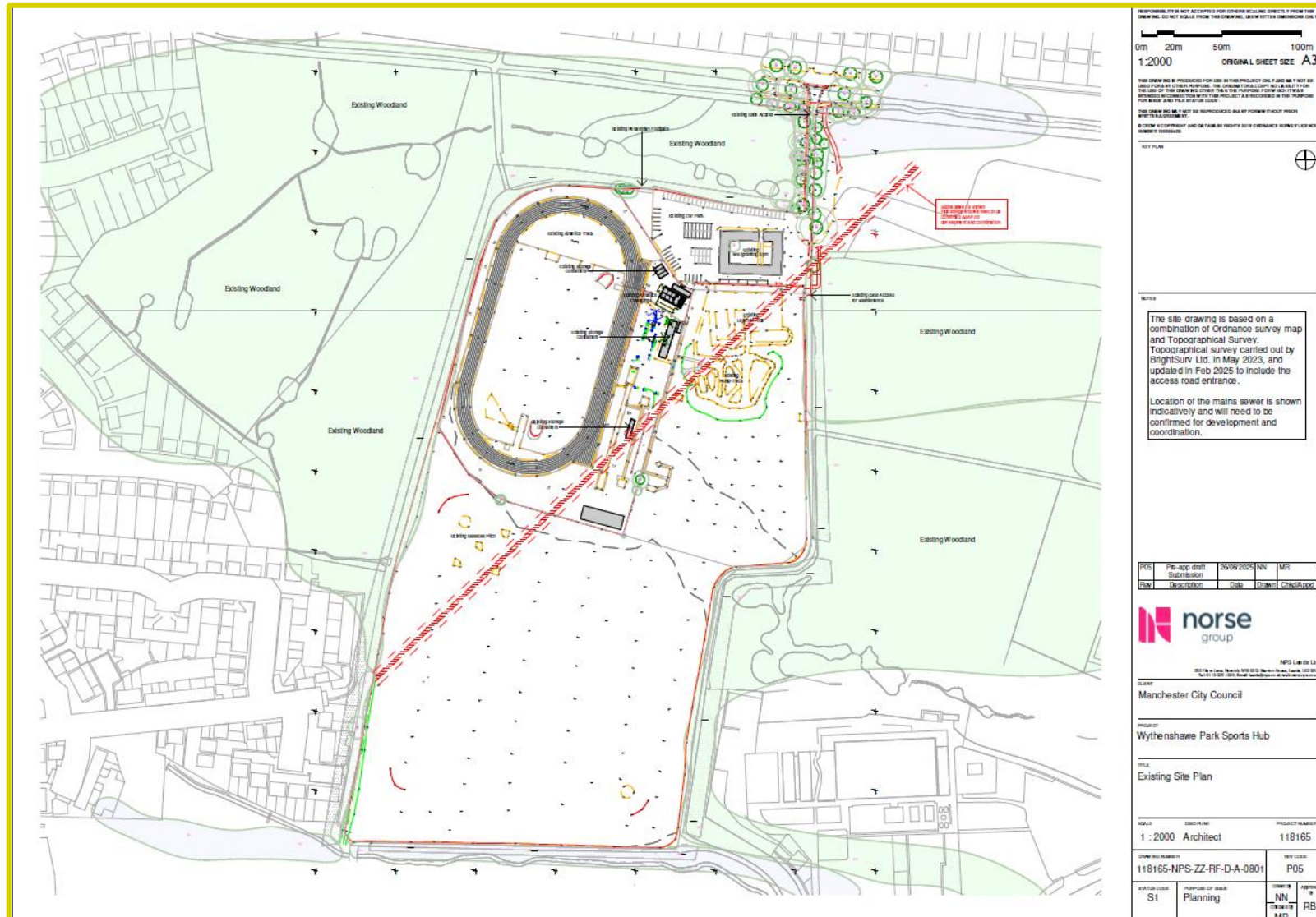
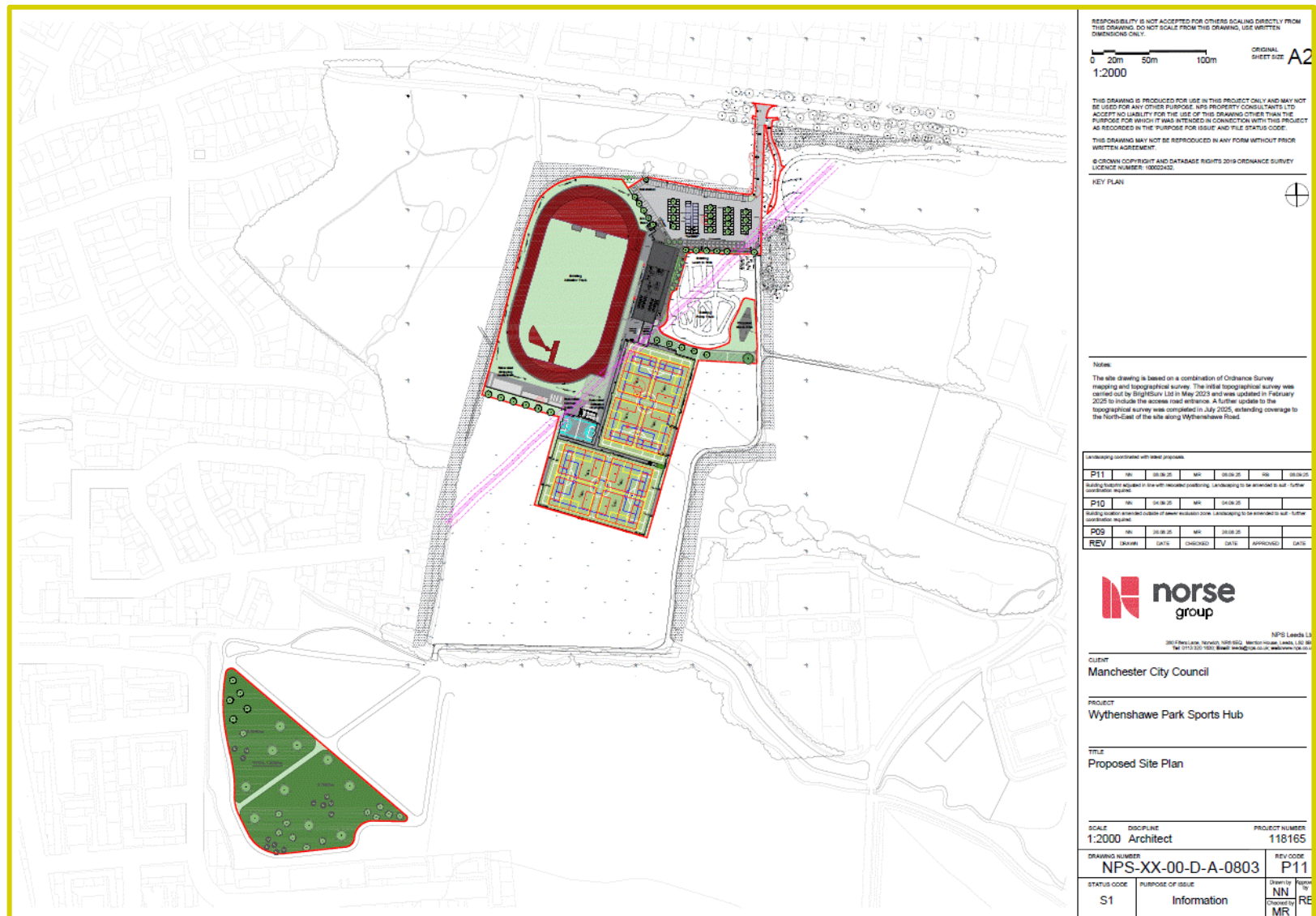


Figure 2: Proposed Site Plan



[illegible]

2. Planning Policy & Assessment Criteria

2.1. Planning Policy

- 2.1.1. *The National Planning Policy Framework (NPPF) 2021 sets out the general requirements for gaining planning permission. Comments regarding noise found within the document are as follows.*

S15. Conserving and enhancing the natural environment

Para 174

Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

S15. Para 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;

b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

S15. Para 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.

- 2.1.2. The NPPF directs us for further specific guidance on noise to the *Noise Policy Statement for England* (DEFRA March 2010) which gives three aims, which should be adhered to when considering a development:

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.

- 2.1.3. Within the document the avoidance of impact on health and quality of life are discussed in the context of terminology used in toxicology as the excerpt from the document discusses below.

- 2.1.4. There are several key phrases within the NPSE aims and these are discussed below.

“Significant adverse” and “adverse”

- 2.1.5. There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

- 2.1.6. **NOEL** – No Observed Effect Level

- 2.1.7. 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.

- 2.1.8. **LOAEL** – Lowest Observed Adverse Effect Level

- 2.1.9. This is the level above which adverse effects on health and quality of life can be detected.

2.1.10. Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

2.1.11. **SOAEL** – Significant Observed Adverse Effect Level

2.1.12. This is the level above which, significant adverse effects on health and quality of life occur.

2.1.13. 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.

2.1.14. The first aim of the Noise Policy Statement for England

Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.1.15. The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development

2.1.16. The second aim of the Noise Policy Statement for England

Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.1.17. The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that 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. This does not mean that such adverse effects cannot occur.

2.1.18. The third aim of the Noise Policy Statement for England

Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.1.19. This aim seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

2.1.20. When considering the requirements for the proposed development, the development should demonstrate that aims of the NPSE have been followed, this is through the application of the more suitable specific guidance on noise both affecting the developments and dealing with noise arising from it.

2.2. Internal Ambient Noise Levels Criteria

2.2.1. The proposed development contains several different uses including leisure facilities, library, meeting rooms, offices and NHS consulting spaces.

2.2.2. The internal ambient noise level criteria for these spaces are drawn from a range of standards. Some areas (such as NHS) have clearly defined guidance documents and standards to meet. Others, (such as leisure) have no specific guidance documents. In these cases, suitable guidance has been adopted from the has been adopted based on Pace Consult's judgement and experience.

2.2.3. The internal ambient noise level criteria are also split into separate targets for external noise ingress and internally generated noise from building services.

2.2.4. The adopted internal ambient noise level criteria are summarised in the table below; the relevant standards from which these have been drawn are also noted. Where a standard is not specifically intended for a given area, as discussed above, this is indicated with a *.

Table 1: Adopted internal ambient noise level criteria.

Room	Internal Noise Level due to External Noise Ingress	Internal Noise Level from Building Services	Guidance Standard
Changing Rooms & Toilets	50 dB $L_{Aeq,30 \text{ mins}}$	NR 45	BB93: 2015 <i>Acoustic Design of School; Performance Standards</i>
Cafe	40 dB $L_{Aeq,30 \text{ mins}}$	NR 35	
Community Space	40 dB $L_{Aeq,30 \text{ mins}}$	NR 35	BS 8233: 2014 <i>Guidance on Sound Insulation & Noise Reduction for Buildings</i>
Staff Office/Room	40 dB $L_{Aeq,30 \text{ mins}}$	NR 35	
General/Clinic Office	40 dB $L_{Aeq,1 \text{ hour}}$	NR 35	Health Technical Memorandum 08:01 <i>Acoustics</i>
Clinical Room	40 dB $L_{Aeq,1 \text{ hour}}$	NR 35	
All circulation throughout building	55 dB $L_{Aeq,1 \text{ hour}}$	NR 40	BB93: 2015 <i>Acoustic Design of School; Performance Standards</i>
Bike Workshop	45 dB $L_{Aeq,1 \text{ hour}}$	NR 40	

2.3. Noise Impact from Fixed Mechanical & Electrical Plant Criteria

- 2.3.1. BS 4142: 2014 + A1:2019 provides a numerical means of assessing the significance of building plant noise. A key aspect of the BS 4142 assessment procedure is a comparison between the background noise level in the vicinity of noise sensitive receptors and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:
- 2.3.2. Background Sound Level, $L_{A90,T}$, defined in the Standard as the 'A-weighted sound pressure level that is exceeded by the residual sound for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels'; •
- 2.3.3. Specific Sound Level, $L_{Aeq,T}$, the 'equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T (being 1 hour for assessments between 07:00-23:00hrs and 15 minutes for night time assessments 23:00-07:00hrs).
- 2.3.4. Rating Level, $L_{Ar,Tr}$, the specific sound level plus any adjustment made for the characteristic features of the sound'.
- 2.3.5. BS 4142 allows for, as an absolute worst case, a cumulative +15 dB correction to be applied to the specific sound level based upon the presence or expected presence of the following 'Acoustic Feature Corrections':
- Tonality – up to +6 dB penalty.*
- Impulsivity – up to +9 dB penalty (this can be summed with tonality penalty)*
- Intermittency – up to +3 dB penalty*
- Other sound characteristics (neither tonal nor impulsive but still distinctive) – +3 dB penalty.*
- 2.3.6. The amendment made to BS4142 in 2019 does however allow for the focus on one characteristic if it is dominant above others, reducing or even eliminating the corrections which would have otherwise been added together arithmetically, in a more reasonable approach to assessment.
- 2.3.7. BS 4142 provides guidance as to the likely response from sensitive residential receptors to new fixed noise sources (e.g., building plant or services) through comparison of the rating level of the new noise source with the existing background

level. The higher the rating noise level in comparison to the background noise level, the greater the likelihood of complaints arising. BS 4142 requires separate analysis for day and night-time periods.

- 2.3.8. The criteria for determining the significance of changes in noise levels from building services plant, based on guidance within BS 4142, and the potential effect on noise sensitive receptors are presented in below.

Difference Between Rating Level¹ and Background Level²	Magnitude of Effect
10 dB(A) below background	Very Low (LOAEL)
No difference	Low
+5 dB(A) above background	Medium (SOEAL)
+10 dB(A) or more above background	High

1 - The Rating Level is the noise level attributable to the new source(s), plus penalties if the new source has tonal or intermittent characteristics.

2 - The Background Level is taken as the L_{A90} ; this is the ambient noise level in the absence of the source which is exceeded for 90% of the time.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

- 2.3.9. BS4142 Offers guidance on the selection of an appropriate value to use as the background sound level within section 8, which is repeated below for information.

8 Background sound level

8.1 General

COMMENTARY ON 8.1

The background sound level is an underlying level of sound over a period, T , and might in part be an indication of relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

*In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. **For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.***

Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes. Furthermore, in this general context it can also be necessary to separately assess weekends and weekday periods.

Since the intention is to determine a background sound level in the absence of the specific sound that is under consideration, it is necessary to understand that the background sound level can in some circumstances legitimately include industrial and/or commercial sounds that are present as separate to the specific sound.

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

8.1.1 As appropriate, for each of the following situations, conduct background sound level measurements under weather conditions that are representative and comparable to the weather conditions when the specific sound occurs or could occur:

- a) a new specific sound source is to be commissioned (see 8.2); or*
- b) a change or modification is to be made to an existing sound source (see 8.2); or*
- c) there is an existing specific sound source not operating continuously (see 8.3); or*
- d) there is an existing specific sound source operating continuously (see 8.4); or*
- e) a new noise-sensitive receptor is being introduced to an environment already experiencing, or that will at a future time experience, industrial and/or commercial sound (see 8.5).*

8.1.2 Where possible, measure the background sound level at the assessment location(s). If this is not possible measure at an alternative location where the residual sound is comparable to the assessment location(s). A detailed justification for considering this should be reported.

NOTE In determining whether an alternative location is suitable for carrying out measurements of the background sound level it is important to take account of all contributing factors that might influence the measurement and assessment procedure. As far as is practicable, uncertainty in any measurement at an alternative location should be minimized and the extent of uncertainty be reported.

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

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

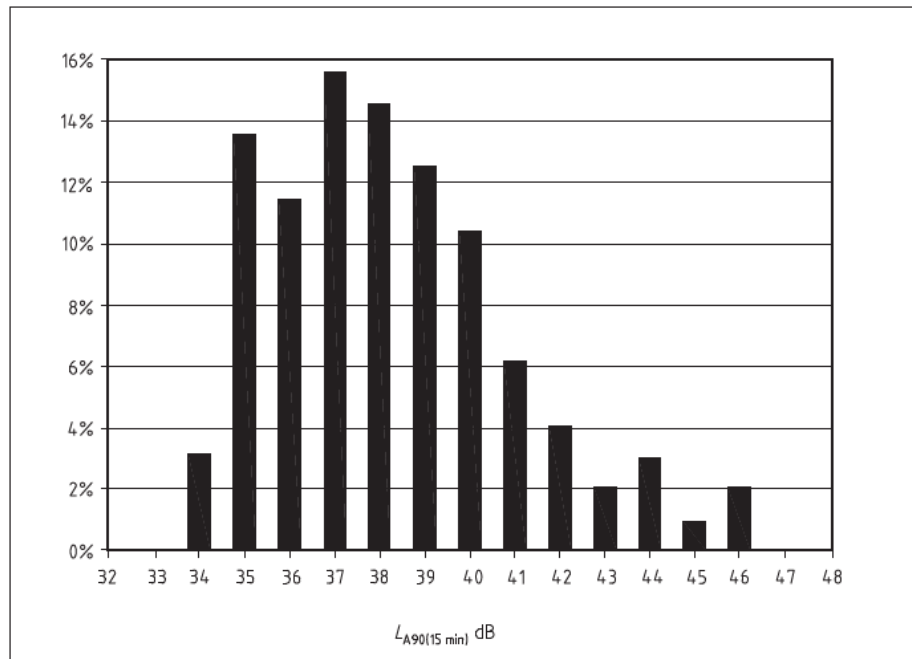
NOTE 1 To obtain a representative background sound level a series of either sequential or disaggregated measurements should be carried out for the period(s) of interest, possibly on more than one occasion. A representative level should account for the range of background sound levels and should not automatically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

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

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

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

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



2.3.10. Manchester City Council Planning & Noise Technical Guidance October 2022 provides the following requirements for noise from mechanical services.

Noise and vibration from fixed plant / equipment

Noise from fixed plant, equipment or machinery can be very annoying and disruptive to people living nearby particularly where that item involved emits a noise with impulsive or tonal characteristics.

Many of the complaints Environmental Health receive about noise from plant, equipment and machinery specifically concern the character of the noise emitted. Any noise assessment needs to consider not only the overall level of noise emitted, but also its particular characteristics. The noise assessment should be based on BS 4142, and any application for fixed plant, equipment or machinery must demonstrate that:

‘Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (LA_{90}) level at the nearest noise sensitive location’.

By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be

of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages. See Appendix A with regards to the expectation of how to calculate a 'typical' background level.

Past experience has shown that this criterion can be readily achieved. Where available, product specification data for new items should be submitted with the acoustic report. Consultants should be using these to compare with data from the noise survey and propose mitigation where the levels are above those specified in the criterion. Where this information is not available a consultant may choose to measure the noise, levels generated by the equipment in question where the equipment has already been installed elsewhere (and in accordance with BS 4142).

Where fixed plant, equipment or machinery is attached to a building the vibration caused by it can pass through the building structure and cause structure borne noise elsewhere in the building. Where it is to be installed in or on a building containing a noise sensitive use structure borne noise should be considered in the noise assessment and adequate control measures should be proposed. An example of where this would be required is where there is a proposal to install ventilation equipment on the roof of a residential apartment block or it could be an air source heat pump attached to the side of a building.

2.4. Noise Impact from Other Sources Associated with the Development Criteria

2.4.1. It is proposed that the IEMA Guidelines for Environmental Noise Impact Assessment are utilized when assessing potential noise impact from other activities associated with the development.

2.4.2. Specific to this site this would include:

- Noise Emissions from the AGPs and other outdoor sports areas.

2.4.3. The guidelines provide specific support on how noise impact assessment fits within the Environmental Impact Assessment (EIA) process. They cover:

- how to scope a noise assessment.
- issues to be considered when defining the baseline noise environment.
- prediction of changes in noise levels as a result of implementing development proposals; and

- definition and evaluation of the significance of the effect of changes in noise levels (for use only where the assessment is undertaken within an EIA).

2.4.4. This guideline includes an assessment table which shows how the impact arising from a change in sound levels could be evaluated. This example table is included below.

Figure 4: IEMA table excerpt

Long-term Impact Classification	Short-term Impact Classification	Sound level change dB L_{pAeqT} (positive or negative) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3 dB and < 5 dB
Moderate	Major	≥ 5 dB and < 10 dB
Major		≥ 10 dB

2.4.5. In addition, the document World Health Organisation (WHO) '*Guidelines for Community Noise*' also states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference.

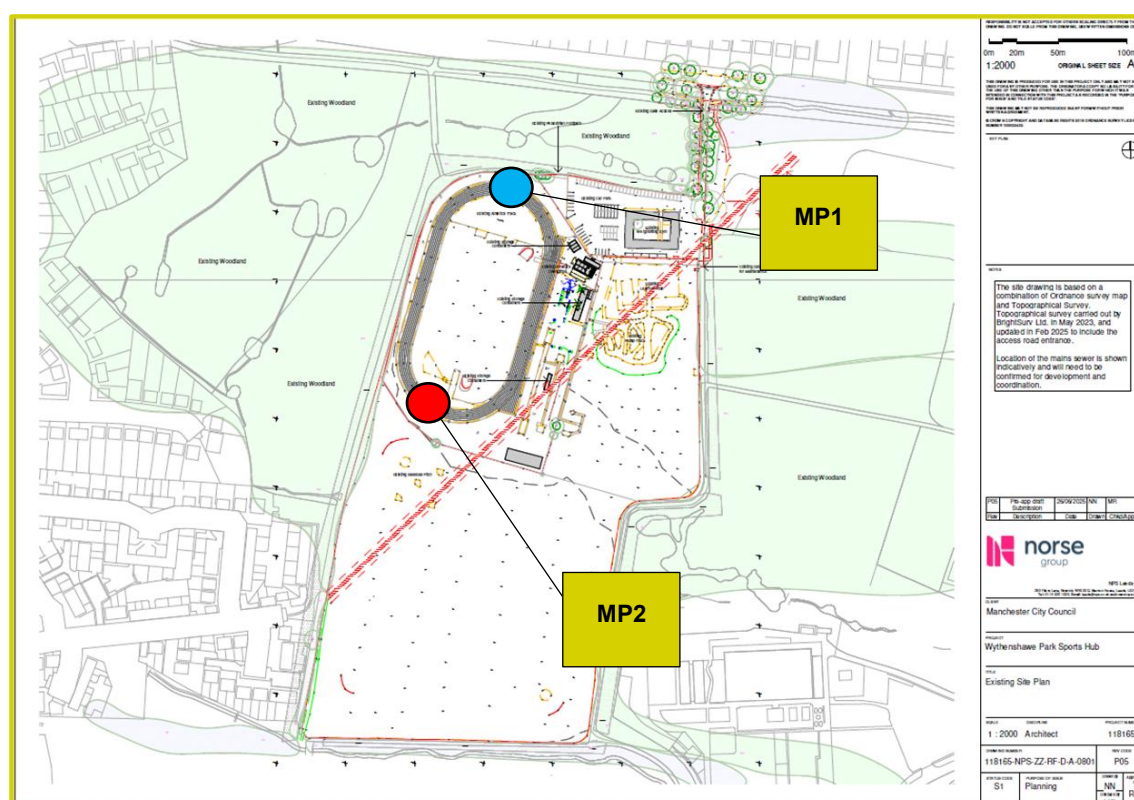
2.4.6. According to this document, to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq} .

3. Baseline Noise Survey

3.1. Method

- 3.1.1. The baseline noise survey was completed between Friday 31st January & Monday 3rd February 2025 to measure representative noise levels at the site of the proposed development, and closest noise sensitive receptors, during typical weekday & weekend periods.
- 3.1.2. The survey was carried out in accordance with the principles of BS 7445:1997 Parts 1-3, '*Description and Measurement of Environmental Noise*', and British Standard BS4142: 2014 + A1:2019: *Methods for rating and assessing industrial and commercial sound*.
- 3.1.3. Noise levels across the site are considered to be generally low and are primarily determined by distant road traffic noise.
- 3.1.4. The figure below show the location of the survey measurement positions.

Figure 5: Baseline noise survey measurement locations



- 3.1.5. Each position is also described in detail below.

- 3.1.6. MP1 – Continuous unattended measurement position on the northern site boundary. The sound level meter was positioned within the boundary of the existing running track, adjacent to a spotlight. The sound level meter microphone was tripod mounted at a height of 1.5m above grounds level and away from any reflective surfaces.
- 3.1.7. MP2 - Continuous unattended measurement position midway along the western site boundary, for security reasons it was not possible to leave the meter any further to the south. The sound level meter was positioned within the boundary of the existing running track, adjacent to a spotlight. The sound level meter microphone was tripod mounted at a height of 1.5m above grounds level and away from any reflective surfaces.

3.2. Measurement Parameters

- 3.2.1. The following measurement parameters were recorded, as a minimum:
- $L_{Aeq, T}$ dB
 - $L_{Amax(fast), T}$ dB
 - $L_{A90, T}$ dB
- 3.2.2. A 15-minute measurement period was used, with a 1s sampling time. The measurements at all survey positions comprised of consecutive measurement periods in terms of the most relevant standards and guidelines.

3.3. Equipment

- 3.3.1. All noise measurements were made with calibrated precision grade 1 sound level meters, which achieve the requirements of BS EN 61672:2003.
- 3.3.2. The equipment used for each survey position is shown in the table below.

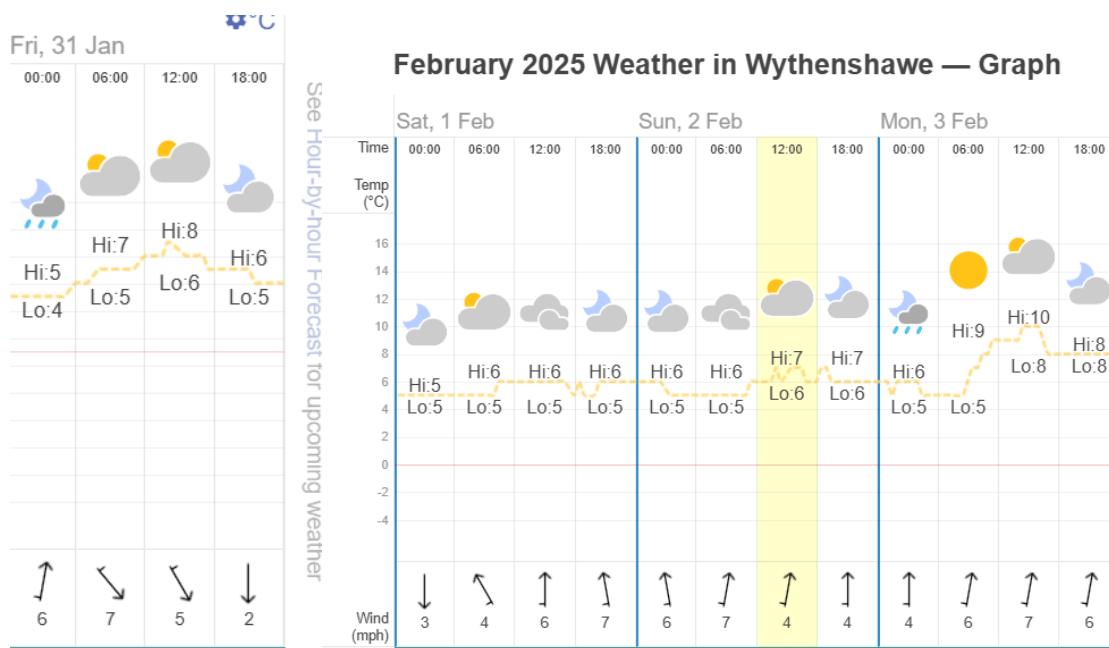
Table 2: Baseline noise survey equipment list

Measurement Position	Item Name	Serial Number	Calibration Certificate
MP1	Norsonic Nor 118	31301	U44177
MP2	Svantek Svan 958	36584	1510015-1S
Calibrator	Norsonic Nor 1251	30998	49213

3.3.3. The sound level meters were calibrated before and after the survey. No significant drift was noted between the two reference checks.

3.4. Weather

3.4.1. The weather for the survey period is shown below.



3.4.2. The weather was noted to be overcast but calm for the entirety of the survey period.

3.5. Results

3.5.1. The measured baseline noise survey results are summarised in the tables below. The full set of survey data is provided graphically in Appendix A.

Table 3: Measurement position MP1 environmental noise survey data

Date & Time	$L_{Aeq, T}$ dB (Log Average)	$L_{AF, max}$ dB (95th Percentile)	$L_{A90, T}$ dB (*Typical)
12:00 to 23:00 31/01/25	51	83	45 (1 hour)
23:00 31/01/25 to 07:00 01/02/25	45	61	40 (15 minutes)
07:00 to 23:00 01/02/25	53	77	50 (1 hour)
23:00 01/02/25 to 07:00 02/02/25	47	64	42 (15 minutes)

07:00 to 23:00 02/02/25	50	72	48 (1 hour)
23:00 02/02/25 to 07:00 03/02/25	46	65	40 (15 minutes)
07:00 to 12:00 03/02/25	53	81	49 (1 hour)

**Note: Following the guidance of BS4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial units & The Association of Noise Consultants BS4142:2014 + A1:2019 Technical Note 2020 Ver 1.0, typical background noise levels for each period have been selected based on statistical analysis of the data. The statistical analyses are included in appendix B at the rear of this report.*

Table 4: Measurement position MP2 environmental noise survey data

Date & Time	L_{Aeq, T} dB (Log Average)	L_{AF, max} dB (95th Percentile)	L_{A90, T} dB (*Typical)
12:00 to 23:00 31/01/25	48	83	43 (1 hour)
23:00 31/01/25 to 07:00 01/02/25	43	68	41 (15 minutes)
07:00 to 23:00 01/02/25	51	74	48 (1 hour)
23:00 01/02/25 to 07:00 02/02/25	45	66	40 (15 minutes)
07:00 to 23:00 02/02/25	48	68	45 (1 hour)
23:00 02/02/25 to 07:00 03/02/25	45	66	38 (15 minutes)
07:00 to 12:00 03/02/25	51	65	49 (1 hour)

**Note: Following the guidance of BS4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial units & The Association of Noise Consultants BS4142:2014 + A1:2019 Technical Note 2020 Ver 1.0, typical background noise levels for each period have been selected based on statistical analysis of the data. The statistical analyses are included in appendix B at the rear of this report.*

4. Noise Impact on the Proposed Development

4.1. Internal Ambient Noise Levels

- 4.1.1. External noise break in to the proposed pavilion building is assessed in the table below.

Table 5: Adopted internal ambient noise level criteria.

Room	Internal Noise Level Limit	Noise Reduction of a Partially Open Window	External Noise Limit
Changing Rooms & Toilets	50 dB $L_{Aeq,30 \text{ mins}}$	-13	63 dB $L_{Aeq,30 \text{ mins}}$
Cafe	40 dB $L_{Aeq,30 \text{ mins}}$		53 dB $L_{Aeq,30 \text{ mins}}$
Community Space	40 dB $L_{Aeq,30 \text{ mins}}$		53 dB $L_{Aeq,30 \text{ mins}}$
Staff Office/Room	40 dB $L_{Aeq,30 \text{ mins}}$		53 dB $L_{Aeq,30 \text{ mins}}$
General/Clinic Office	40 dB $L_{Aeq,1 \text{ hour}}$		53 dB $L_{Aeq,30 \text{ mins}}$
Clinical Room	40 dB $L_{Aeq,1 \text{ hour}}$		53 dB $L_{Aeq,30 \text{ mins}}$
All circulation throughout building	55 dB $L_{Aeq,1 \text{ hour}}$		68 dB $L_{Aeq,30 \text{ mins}}$
Bike Workshop	45 dB $L_{Aeq,1 \text{ hour}}$		58 dB $L_{Aeq,30 \text{ mins}}$

- 4.1.2. The table above shows that all spaces could potentially be ventilated using partially open windows, as the highest measured ambient noise levels from the noise survey was 53 dB $L_{Aeq,30 \text{ mins}}$. However, it is expected that a sealed façade and mechanical ventilation system would be used as is typical for this type of project.
- 4.1.3. As all spaces could potentially be ventilated using partially open windows a fully sealed façade and mechanical ventilation system will by definition provide even greater façade sound insulation.
- 4.1.4. Therefore, there are no particular acoustic requirements for the façade of the building. A typical SFS and thermal double glazing construction would provide adequate sound insulation against the existing environmental noise sources.

5. Noise Impact from the Proposed Development

5.1. Noise Impact from Fixed Mechanical & Electrical Plant

- 5.1.1. A schedule of plant items and their operational hours is not available at this stage of the project. It is assumed that plant items may include mechanical ventilation equipment.
- 5.1.2. There is the possibility that these items may operate during the night-time period (23:00 – 07:00). Plant noise rating limits have therefore been provided for daytime and night-time hours.
- 5.1.3. The residential houses on Wythenshawe Road to the North & Lawnhurst Avenue to the West are considered to be currently the closest sensitive receptor to the new development.
- 5.1.4. A noise rating limit for new items of mechanical equipment 5 dB below the prevailing background noise level is required by the local authority. The following noise rating limits at the nearest sensitive receiver are therefore applicable:

Table 6 – Daytime (07:00 to 23:00) Noise rating limits

Position	Noise rating limit at closest sensitive receiver $L_{Aeq, T}$
MP1 – Wythenshawe Road	40 dB
MP2 – Lawnhurst Avenue	38 dB

Table 7: Night-time (23:00 to 07:00) noise rating limits

Position	Noise rating limit at closest sensitive receiver $L_{Aeq, T}$
MP1 – Wythenshawe Road	35 dB
MP2 – Lawnhurst Avenue	33 dB

- 5.1.5. It is proposed that the rating limits above should apply at 1m from the closest residential facades to the site.
- 5.1.6. Any mechanical equipment associated with the development may require attenuation and this should be addressed at the design stage.
- 5.1.7. Noise levels generated by mechanical plant and experienced by local receptors will depend upon a number of variables, the most significant of which are considered to be as follows.

- Noise generated by plant or equipment used to service the building, generally expressed as sound power levels (SWL)
- Distance between the noise source and the receptor
- Attenuation due to ground absorption, atmospheric and barrier effects
- Periods of operation of the plant on the site, known as its “on-time”

5.1.8. The selection of new plant at the time of writing has not been finalized. A detailed noise analysis should be completed and a specification for noise control of plant items developed to meet the cumulative plant noise limits above at the detailed design stage.

5.1.9. However, the following preliminary equipment schedule has been provided at Stage 3.

Figure 6: Preliminary MEP equipment schedule.

Please find attached the two Stage 3 roof layout drawings for Wythenshawe Park. The plant on the roof comprises of:

- 2x air handling units (AHU-01 and AHU-02)
- 3x extract fans (EF-01 to EF-03)
- 6x VRF/DX condensing units (CU-01 to CU-06)

The plant selections aren't final as we are only at Stage 3. However, we have received selections from manufacturer's to give us an understanding of what could potentially be installed as part of these works.

File name 'Extract from AirVent...' provides details on all ventilation units considered for the project, including AHU-01, AHU-02 and EF-01 to EF-03 located on the roof. All ventilation units with the exception of EF-01 (which serves the kitchen extract) will have attenuators within the air streams.

The condensing units proposed at Stage 3 are Toshiba, of the following models:

MMY-SUG1601MT8P-E (CU-01) – file name '10081_BROCHURE_SHRM-ADVANCE' attached

MMY-SUG2201MT8P-E (CU-02)

MMY-SUG1201MT8P-E (CU-03)

RAV-GM901ATP-E (CU-04 and CU-05) – file name 'Product-bulletin-new...'

RAV-GM1101ATP-E (CU-06) – file name 'RAV-GM1101ATP-E...'

5.1.10. The initially provided noise data for these units is shown below.

Figure 7: CU01, CU02 & CU03 noise data

Physical data										
Outdoor unit		MMY-SUG0801MT8P-E	SUG1001MT8P-E	SUG1201MT8P-E	SUG1401MT8P-E	SUG1601MT8P-E	SUG1801MT8P-E	SUG2001MT8P-E	SUG2201MT8P-E	SUG2401MT8P-E
	m³/h	9900	10500	11700	11880	15300	16800	15900	16500	16800
Sound power level	dB(A) H	77.0	78.0	82.0	84.0	87.0	89.0	89.0	90.0	91.0
Sound pressure level	dB(A) H	56.0	58.0	62.0	63.0	64.0	67.0	67.0	67.0	69.0
Sound power level	dB(A) C	74.0	75.0	79.0	79.0	83.0	84.0	85.0	86.0	86.0
Sound pressure level	dB(A) C	53.0	55.0	58.0	58.0	60.0	61.0	63.0	64.0	64.0
External static pressure available	Pa	80.0								
Dimensions (h×w×d)	mm	1690x990x780				1690x1290x780				
Weight	kg	232				329		361		
Compressor type	Hermetic Twin Rotary									

Figure 8: CU04 & 05 noise data

Outdoor Unit			
Air Flow		(m ³ /h)	2900
Outer dimension	Height	(mm)	630
	Width	(mm)	800
	Depth	(mm)	300
Total weight		Main unit (kg)	47.0
Pipe	Min. length	(m)	5.0
	Max. total length	(m)	50.0
Flare Connections	Gas side	(mm)	15.9
	Liquid side	(mm)	9.5
Sound pressure level	Cooling/Heating	(dB)	51/55
Sound power level	Cooling/Heating	(dB)	68/72
Operating Range	Cooling	(°C)	-15/46
	Heating	(°C)	-15/15
- * Awaiting data			

Figure 9: CU06 noise data

Technical Data			
Model reference			RAV-GM1101ATP-E
Nominal	Cooling Capacity	kW	9.5
	Heating Capacity	kW	11.2
Operating Range	Cooling/Heating	°C	-15 to 46/-15 to 15
Air Flow	High	m ³ /h - l/s	4080 - 1133
Sound	Pressure High Cooling/Heating	dB(A)	54/57
	Power High Cooling/Heating	dB(A)	70/74
Unit	Height x Width x Depth	mm	890 x 900 x 320
	Weight	kg	68
Pipe Connection	Flare Connections (gas - liquid)	inch	5/8 - 3/8
	Min.-Max. Length	m	5-50
	Maximum Height Difference	m	±30
	Drain Port Connection	mm	16
Refrigerant R32	Base Charge/Chargeless Length	kg/m	2.1/30
	Additional Charge Liquid Side	g/m	35
Run Current	Maximum	A	14.20
Power Cable	Outdoor to Indoor		3 core + earth
Power Supply	Suggested Fuse Size	V/ph/Hz-A	220-240/1/50-20

5.1.11. There is no noise data for EF-01.

Figure 10: EF02 noise data

Centre Frequency Hz	63	125	250	500	1k	2k	4k	8k
Fan Inlet PWL dB	56	57	56	61	53	53	51	45
Fan Outlet PWL dB	63	63	62	67	59	61	56	50

Figure 11: EF03 noise data

Centre Frequency Hz	63	125	250	500	1k	2k	4k	8k
Fan Inlet PWL dB	55	58	57	57	52	48	43	34
Fan Outlet PWL dB	60	63	62	62	57	53	48	39

Figure 12: AHU 01 Supply Side noise data

Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Inlet	66	73	71	70	66	63	60	58
Outlet	70	82	77	79	77	73	67	64

Figure 13: AHU 01 Exhaust Side noise data

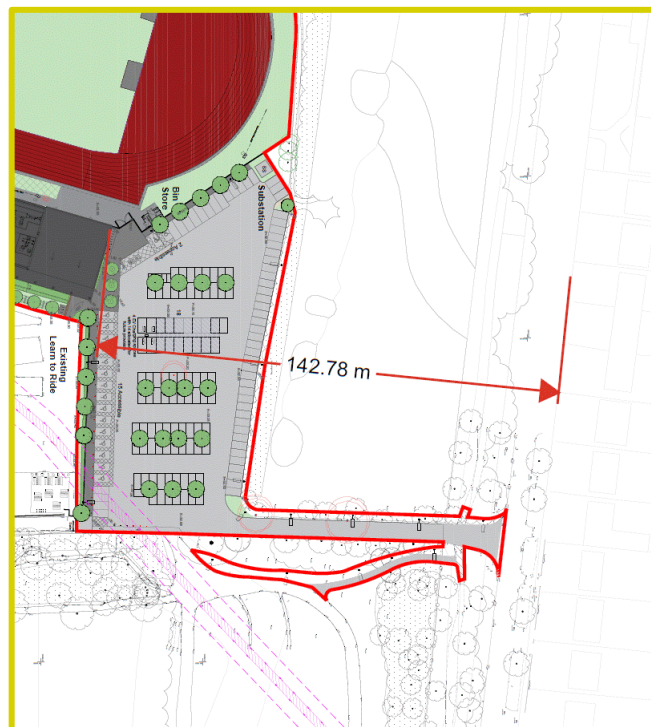
Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Inlet	65	72	71	68	65	62	59	57
Outlet	69	81	75	78	76	71	66	63

Figure 14: AHU 02 Supply Side noise data

Frequency	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Inlet	58	72	63	63	60	56	54	50
Outlet	61	75	66	67	69	65	62	57

- 5.1.12. There does not appear to be any noise data for the exhaust side of AHU 02.
- 5.1.13. Based on the above data an initial simple calculation of predicted noise levels at the closest sensitive receptors has been completed. This is based on the distance from the closest point of the proposed building to each receptor and as such represents a worst-case scenario. See figure below.

Figure 15: Approximate distance to proposed receptor



- 5.1.14. The calculated noise levels to the properties on Wythenshawe Road (closest receptor to the building itself) are shown in the table below.

Atmosphere Side / Building Location	Mfr's source level	Mfr's Distance	Actual Distance	Distance Correction	Screening?	Calculated dBA
AHUs						
AHU 01 Fresh Air Inlet			Calculated Separately			24
AHU 01 Exhaust			Calculated Separately			28
AHU 02 Fresh Air Inlet			Calculated Separately			28
Condensers & ASHPs						
CU-01	87	L _w	140	36		36
CU-02	90	L _w	140	39		39
CU-03	82	L _w	140	31		31
CU-04	72	L _w	140	21		21
CU-05	72	L _w	140	21		21
CU-06		L _w	140	-51		-51
						0
Efs						
EF02			Calculated Separately			20
EF03			Calculated Separately			14
HRUs						
HRU 01 Inlet	70.2	L _w	140	19		19.3
HRU 01 Outlet	74.7	L _w	140	24		23.8
HRU 02 Inlet	68.7	L _w	140	18		17.8
HRU 02 Outlet	74.6	L _w	140	24		23.7
HRU 03 Inlet	67.1	L _w	140	16		16.2
HRU 03 Outlet	72.1	L _w	140	21		21.2
HRU 04 Inlet	71.3	L _w	140	20		20.4
HRU 04 Outlet	77.5	L _w	140	27		26.6
HRU 05 Inlet	65.5	L _w	140	15		14.6
HRU 05 Outlet	71.4	L _w	140	20		20.5
HRU 06 Inlet	65.5	L _w	140	15		14.6
HRU 06 Outlet	71.4	L _w	140	20		20.5
HRU 07 Inlet	70.2	L _w	140	19		19.3
HRU 07 Outlet	74.7	L _w	140	24		23.8
HRU 08 Inlet	70.2	L _w	140	19		19.3
HRU 08 Outlet	74.7	L _w	140	24		23.8
HRU 09 Inlet	70.2	L _w	140	19		19.3
HRU 09 Outlet	74.7	L _w	140	24		23.8
HRU 10 Inlet	69.1	L _w	140	18		18.2
HRU 10 Outlet	74.5	L _w	140	24		23.6
					Resultant	42.6dBA
					Day Limit	40

5.1.15. Some initial assessment guidance and notes are:

- The criterion noise limit (if accepted by the local authority) is a cumulative limit (i.e. for all MEP equipment associated with the building summed together).
- The initial calculation indicates a potential partial exceedance of the daytime noise limit.
- The main contributors to the total noise level at the receptor are CU-01, 02 & 03.

- It is stressed that the above is not a detailed assessment and detailed modelling would need to be completed at stage 4. There may be elements of screening (from parapets or barriers) that would further reduce noise levels. The calculated exceedance is fairly low and only a small reduction would be required to meet the criterion.
- The above does not include for attenuators fitted to any of the AHUs or extract fans. As the units are not significantly contributing only relatively minor amounts of attenuation should therefore be required.
- It is noted that there is no noise data for EF01 and this should be provided for the detailed assessment.
- It is also noted that there are no casing radiated noise levels provided for the AHUs or extract fans and this should also be provided for the detailed assessment.
- Finally it is noted that the above is an assessment against the daytime noise limit only. The criterion during the night-time is lower. The daytime period is defined as 07:00 to 23:00 while the night time period is defined as 23:00 to 07:00. Should any equipment operate during the night time period then further attenuation may be required. It is noted that a common occurrence is for the condensers to operate at a reduced duty during this period and if this is the case, the manufacturer must substantiate any claimed lower noise levels for the reduced duty with appropriate noise data.

5.2. Noise Impact from AGPs

- 5.2.1. The assessment methodology for AGPs is taken from the Sport England document *Sport England Artificial grass Pitches 2015*. The relevant text and figures are shown below.

Comparison of AGP noise against existing noise climate

In some circumstances, an alternative assessment methodology may be appropriate such as where there are changes to an existing natural turf or AGP pitch, or where existing noise levels in the area are high.

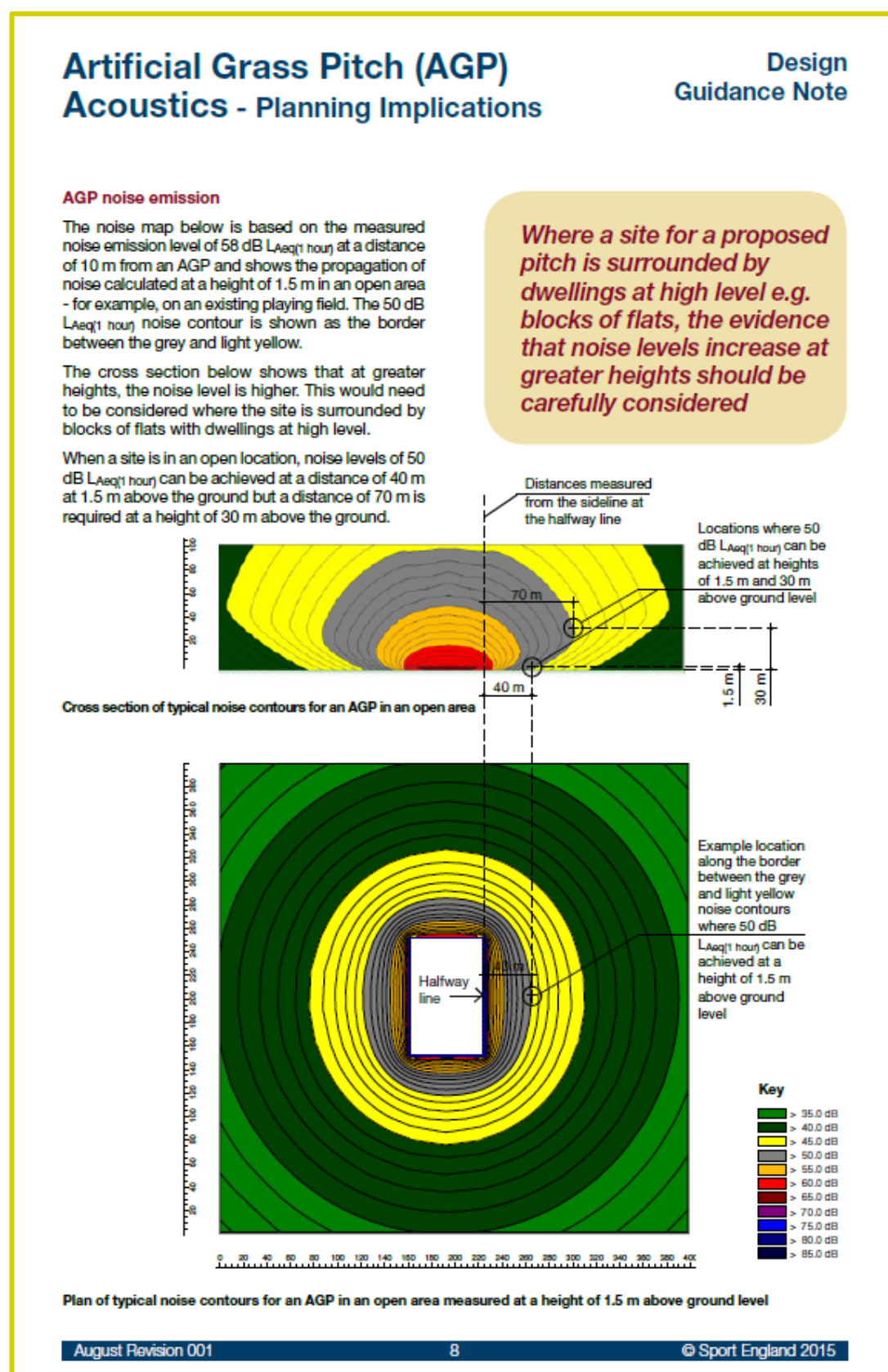
The IOA/IEMA 3 Working Party Consultation Draft 2002 categorises the significance of a change in noise level. Although this is currently at a draft stage, it provides some helpful guidance on the impact of changes in noise levels.

A 'slight' impact is considered for an increase less than 3 decibels. This generally conforms with the withdrawn Planning Policy Guidance Document 24 statement that a change of 3 dB(A) is the minimum perceptible under normal conditions.

Where noise from the new source (the AGP) does not exceed the existing noise climate the increase in noise will be no more than 3 decibels. This is the minimum that can normally be perceived. The noise levels are both to be measured using the LAeq parameter over the same time period, T.

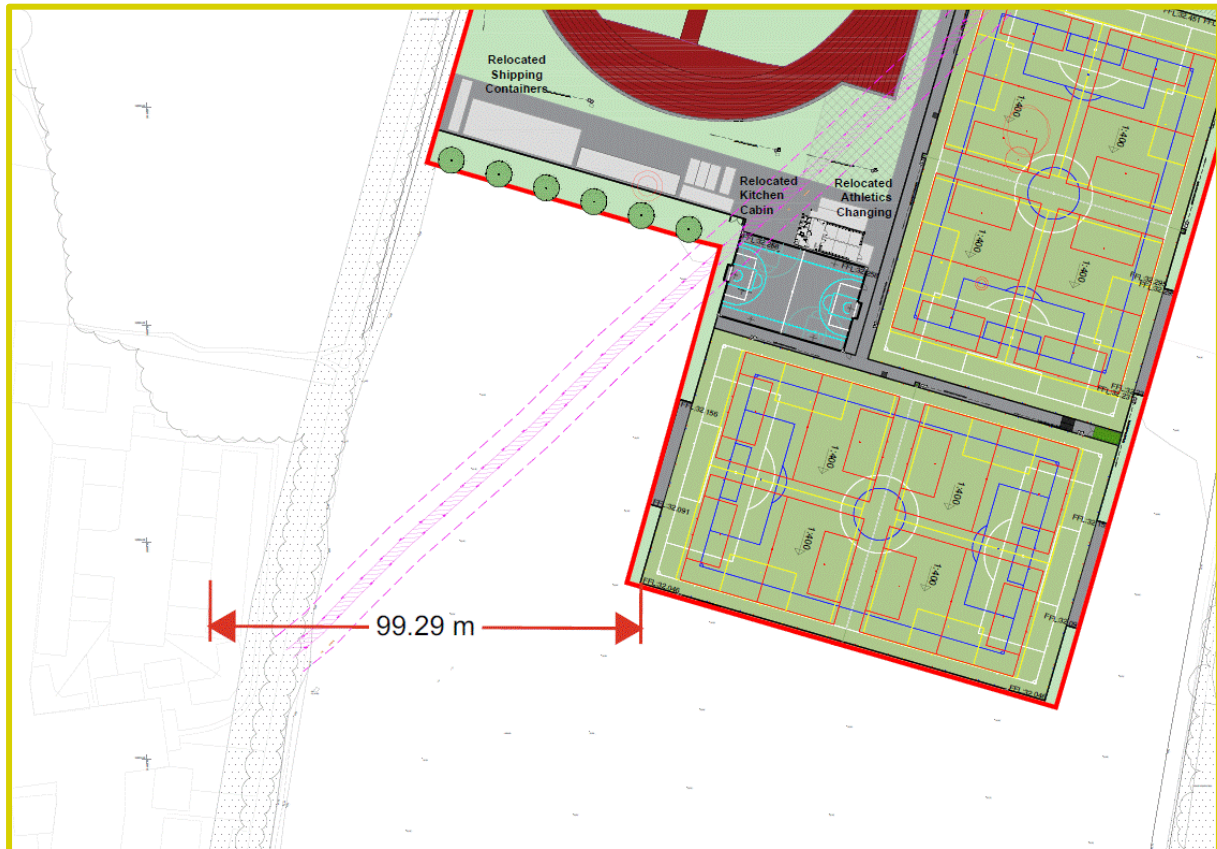
In some instances it may be beneficial to use both a comparative and absolute assessment method.

Figure 16: Noise level information from Sport England Artificial grass Pitches 2015



- 5.2.2. For this development the closest receptors are the residential dwellings on Lawnhurst Avenue. These are either approximately 90m or 30m away, depending on which configuration of AGPs is opted for (see below).

Figure 17: Closest receptor to AGPs



- 5.2.3. As per figure 11, the expected noise emission level from the AGP would be approximately 40 dB $L_{Aeq,T}$ at 99m.
- 5.2.4. The lowest measured ambient noise levels during the daytime at MP2 are 48 dB $L_{Aeq,T}$.
- 5.2.5. As per the Sport England document and the IEMA methodology a negligible short and long term noise impact would be expected for the two proposed AGPs.

6. Conclusion

- 6.1.1. A baseline noise survey and noise impact assessment has been completed for the Wythenshawe Park Sports Hub development.
- 6.1.2. Measurements of ambient noise levels affecting the proposed development and background noise levels at the closest noise sensitive receptors have been measured.
- 6.1.3. Noise impact on the site has been assessed. Although noise break-in to the new buildings is not expected to be an issue. Although all spaces could potentially utilise natural ventilation via partially open windows it is expected that a sealed façade and mechanical ventilation strategy would be implemented due to other design factors.
- 6.1.4. Noise rating limits, for new building services plant at the closest noise sensitive receptors have been provided, based on the measured background noise levels.
- 6.1.5. Noise break-out from the external sports pitches areas has also been assessed.

7. Appendix A – Baseline Noise Survey Data

Figure 18: MP1 baseline environmental noise data time history

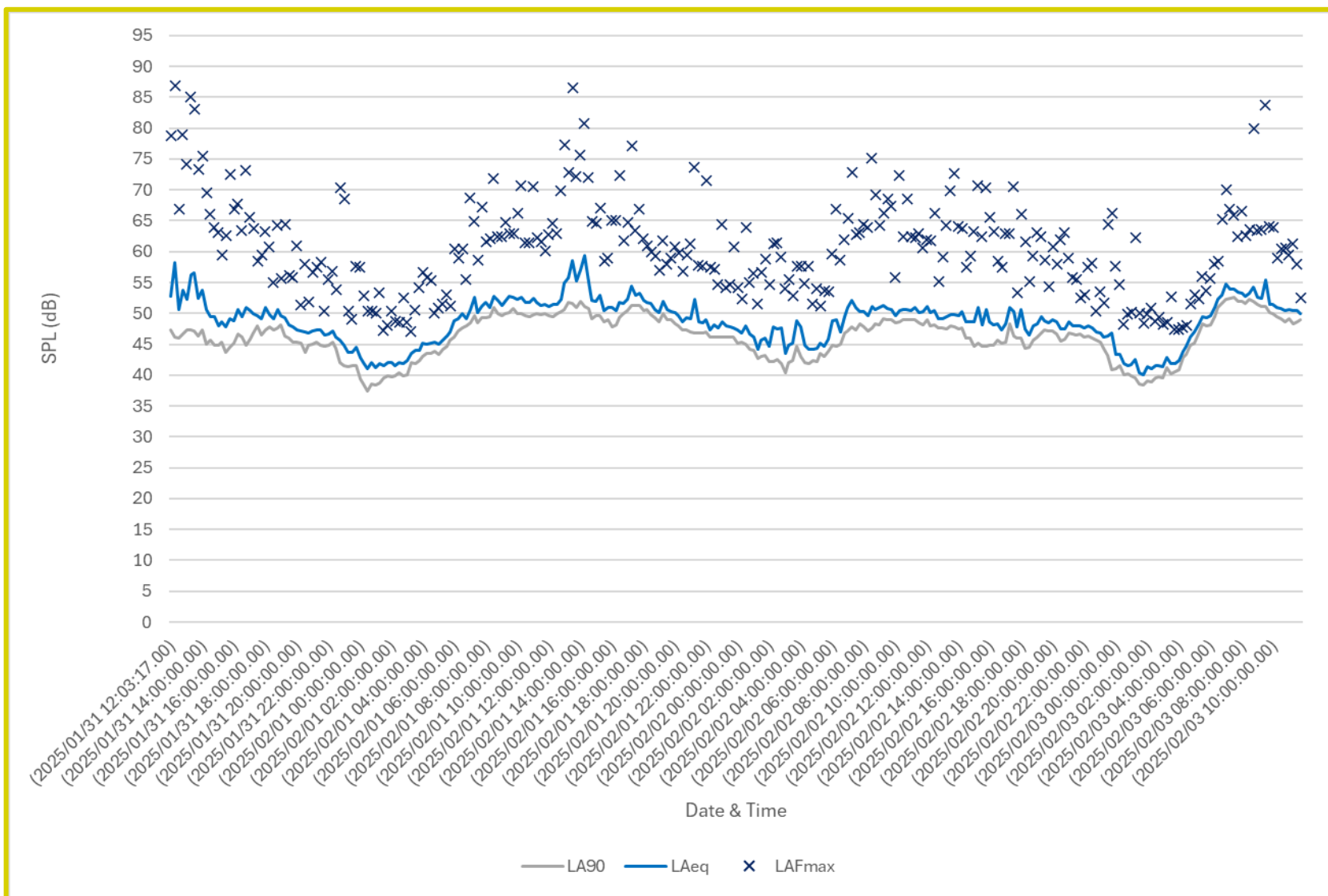
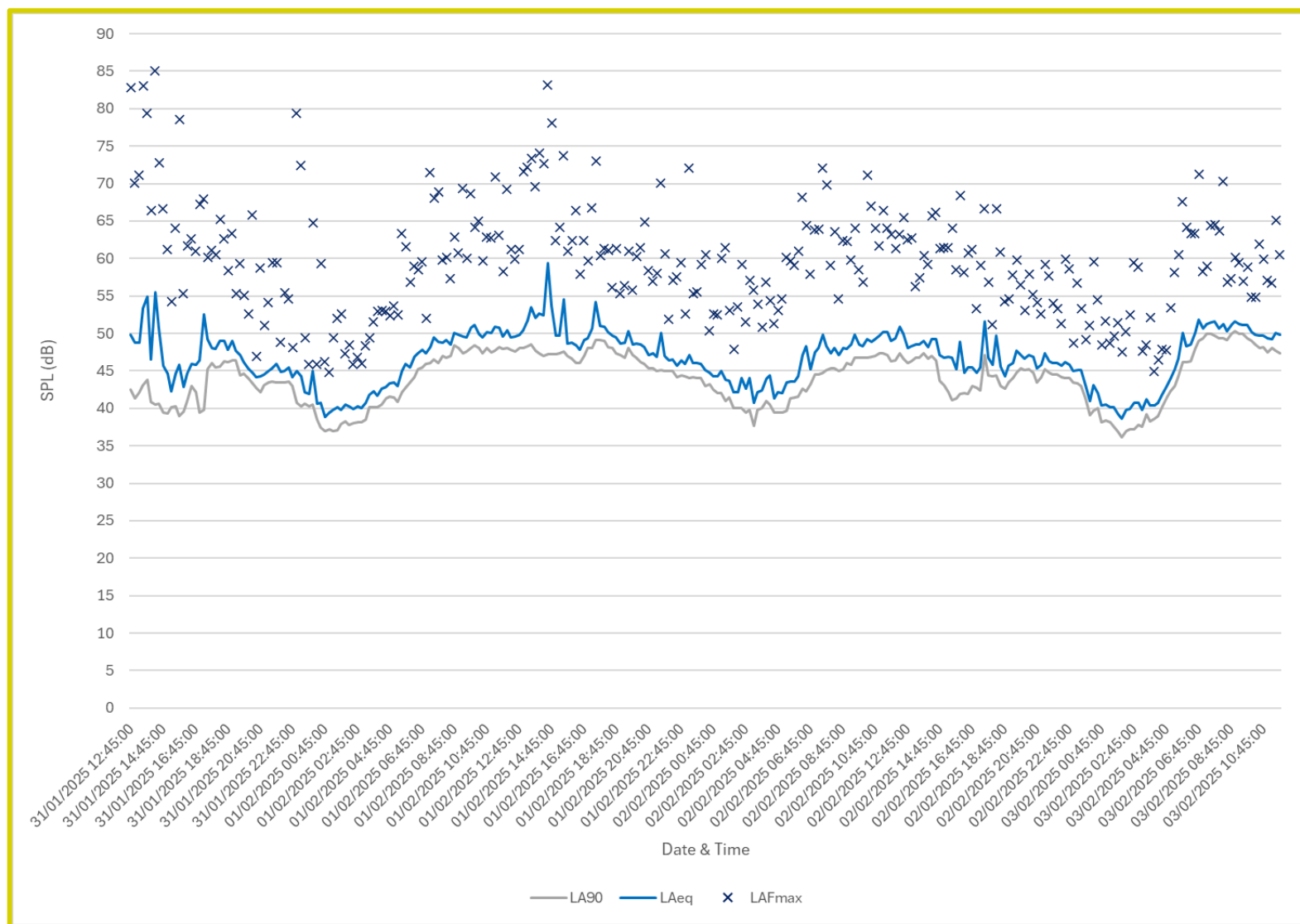


Figure 19: MP2 baseline environmental noise data time history



8. Appendix B - L_{A90} Statistical Analyses

Figure 20: MP1 background noise data statistical analysis Friday Day

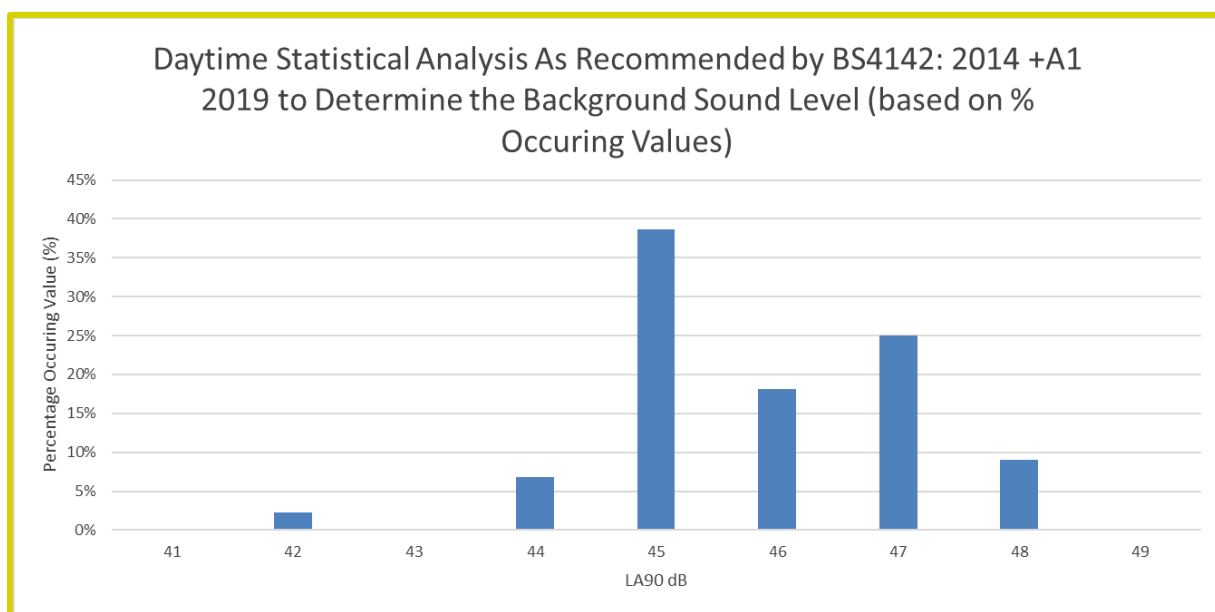


Figure 21: MP1 background noise data statistical analysis Friday Night

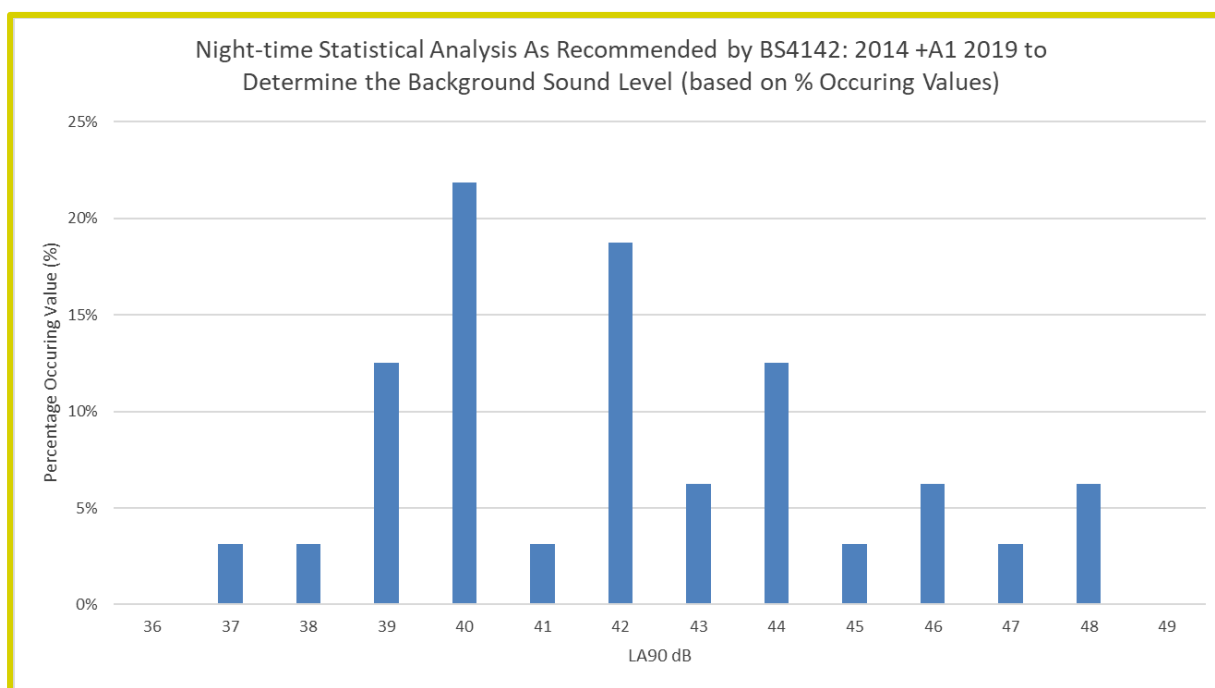


Figure 22: MP1 background noise data statistical analysis Saturday Day

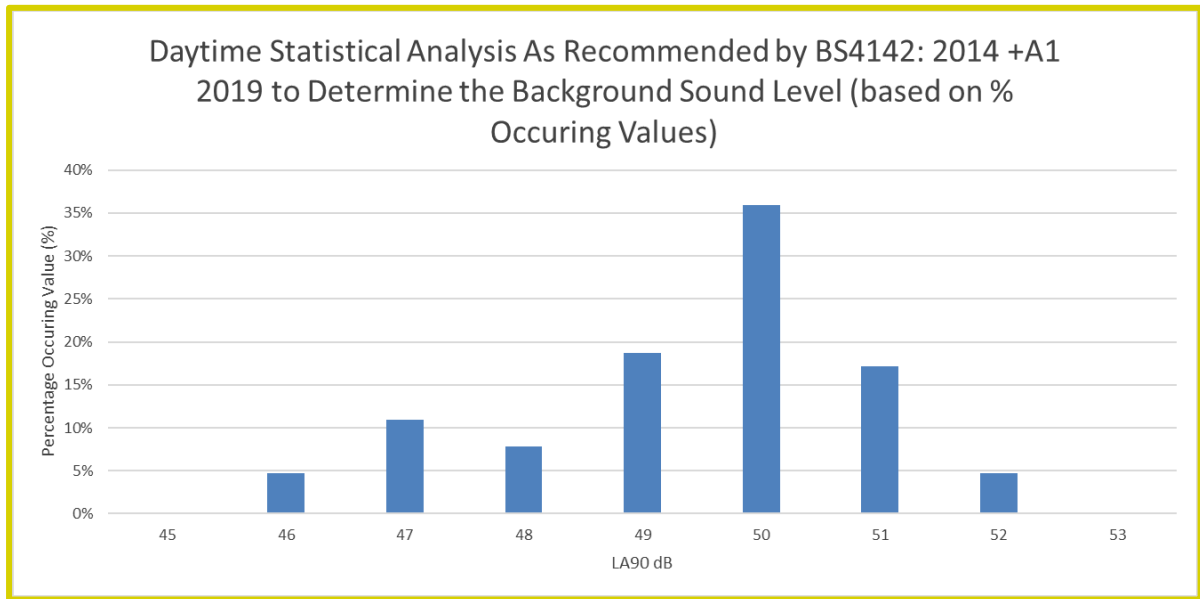


Figure 23: MP1 background noise data statistical analysis Saturday Night

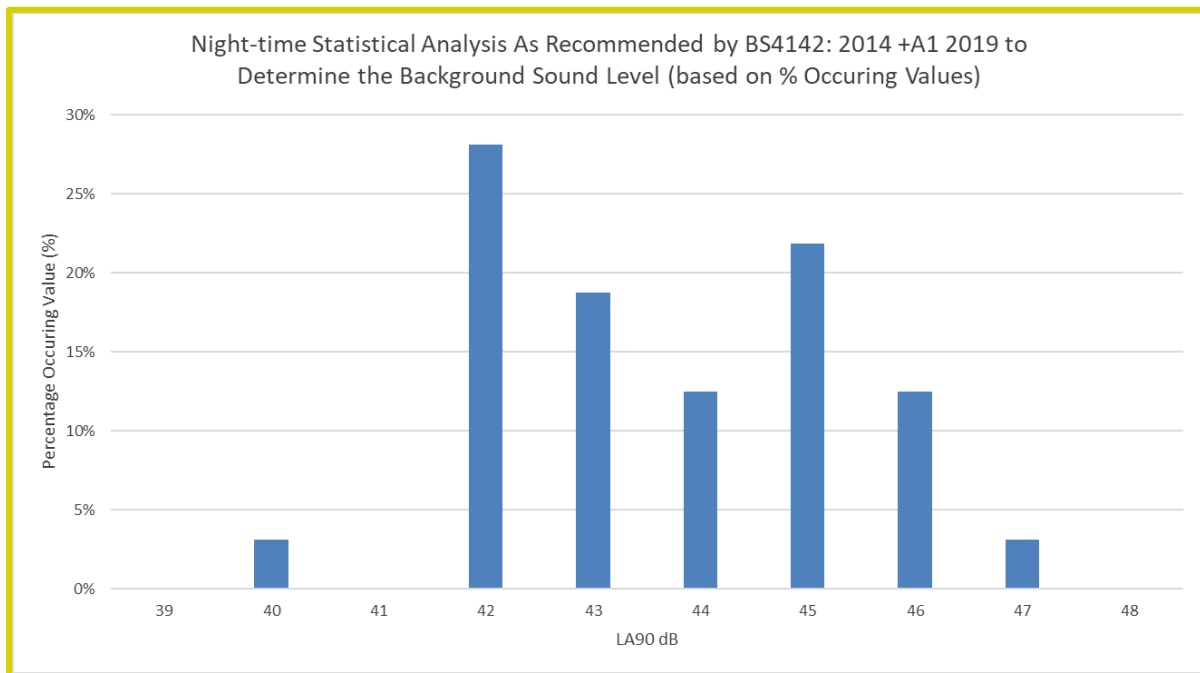


Figure 24: MP1 background noise data statistical analysis Sunday Day

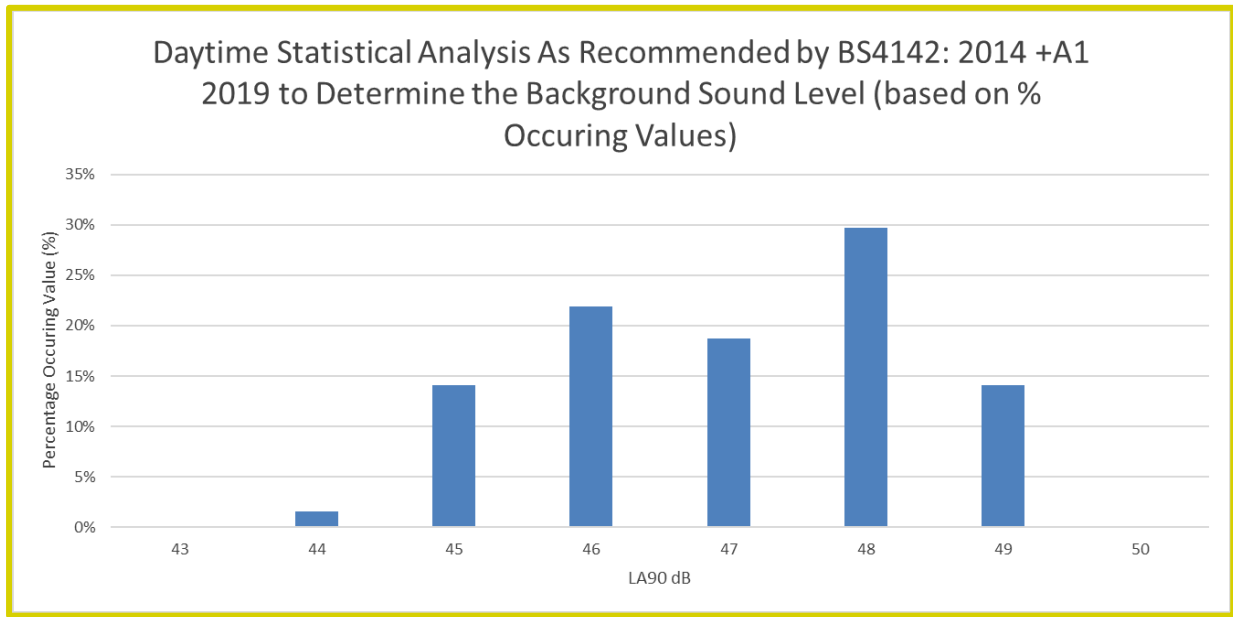


Figure 25: MP1 background noise data statistical analysis Sunday Night

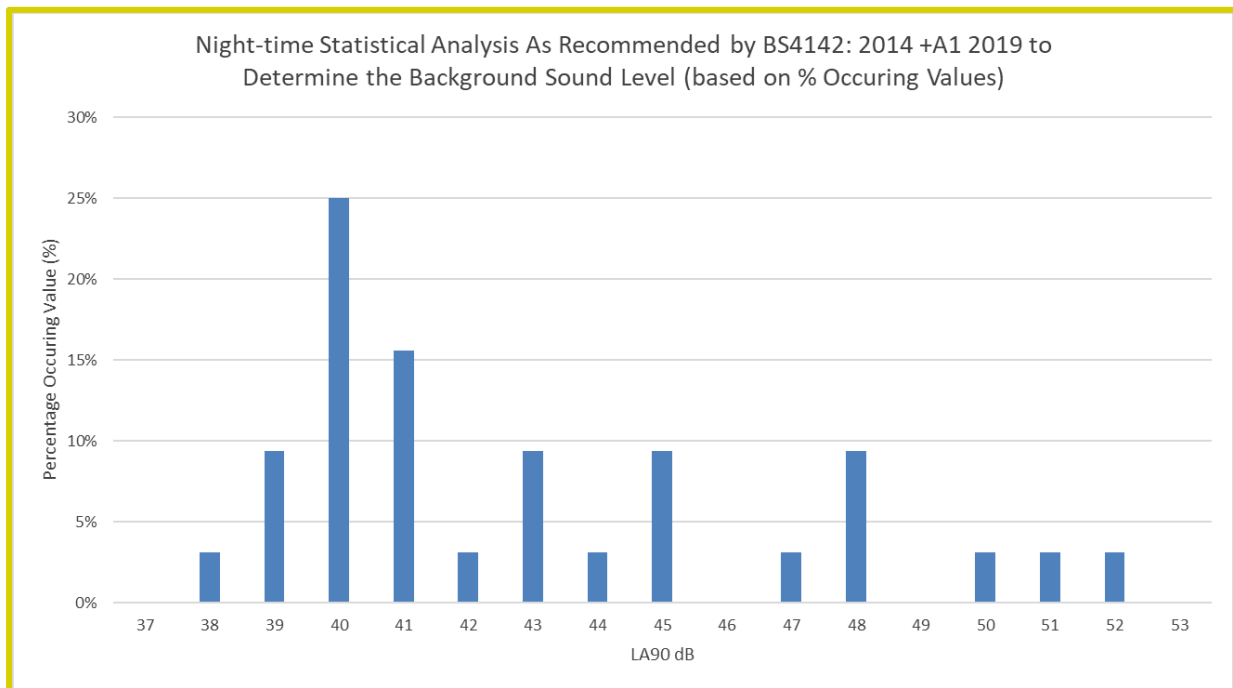


Figure 26: MP1 background noise data statistical analysis Monday Day

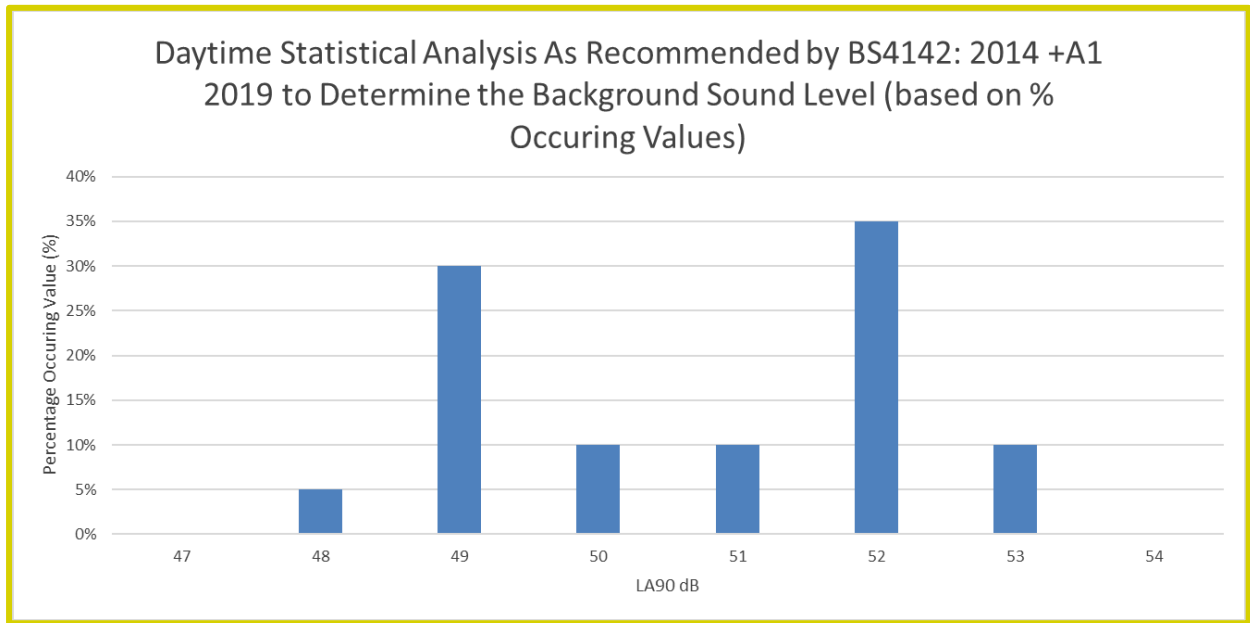


Figure 27: MP2 background noise data statistical analysis Friday Day

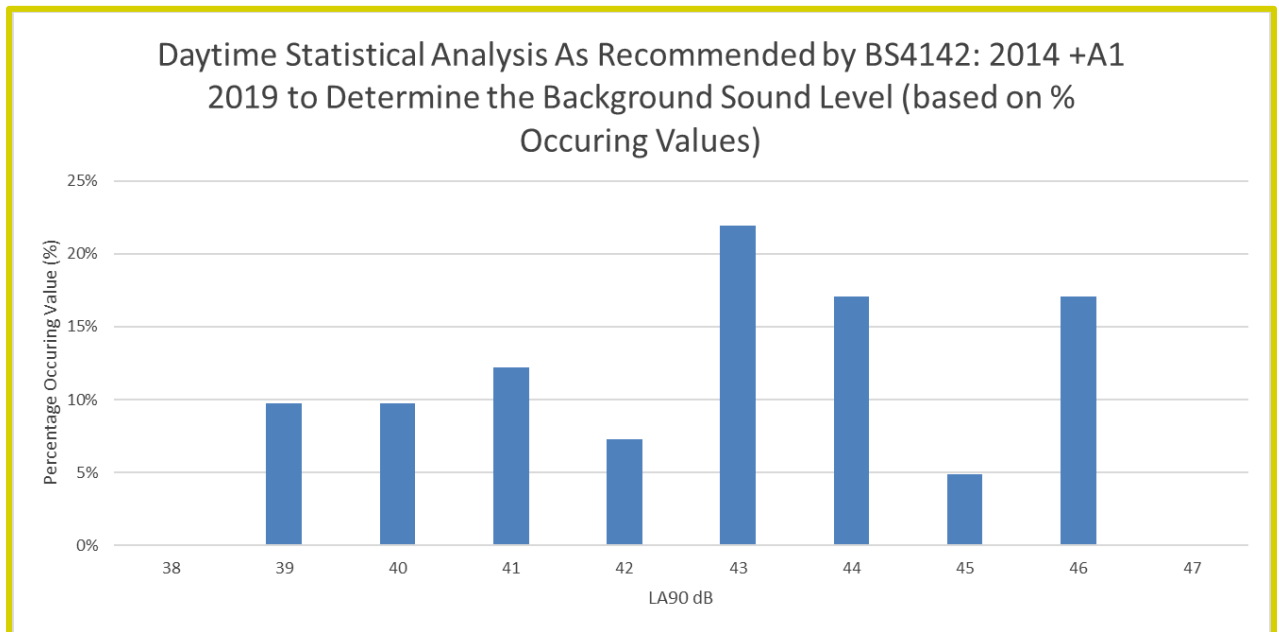


Figure 28: MP2 background noise data statistical analysis Friday Night

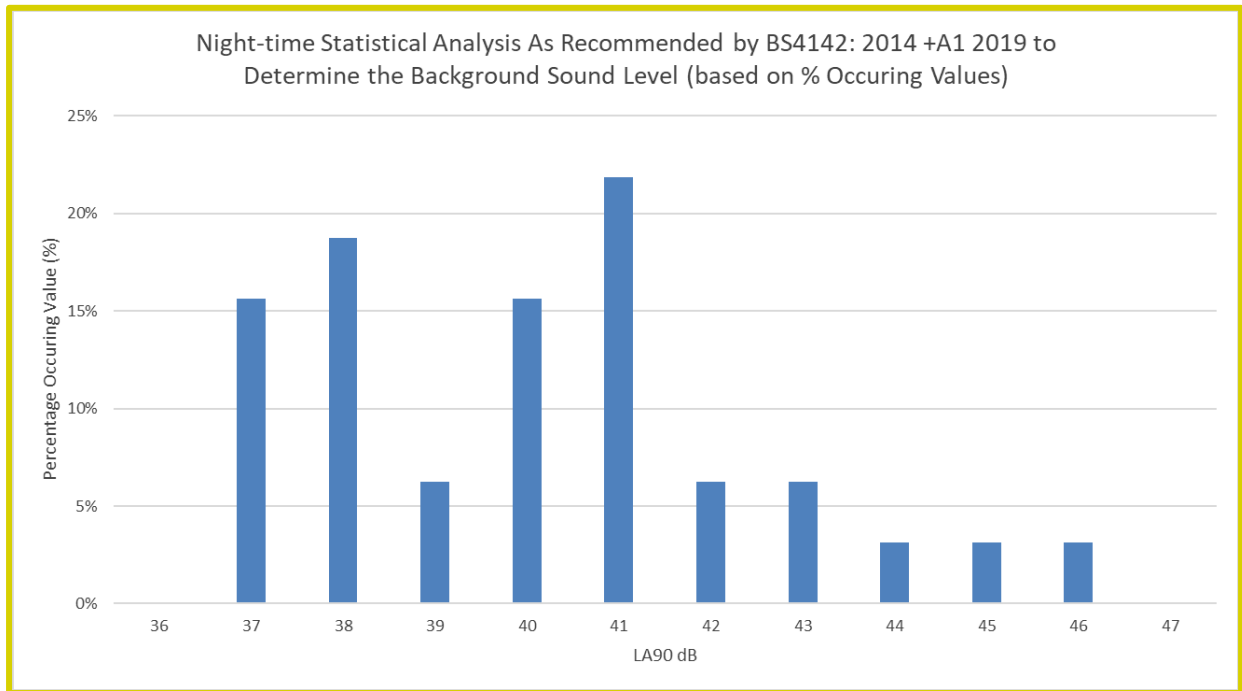


Figure 29: MP2 background noise data statistical analysis Saturday Day

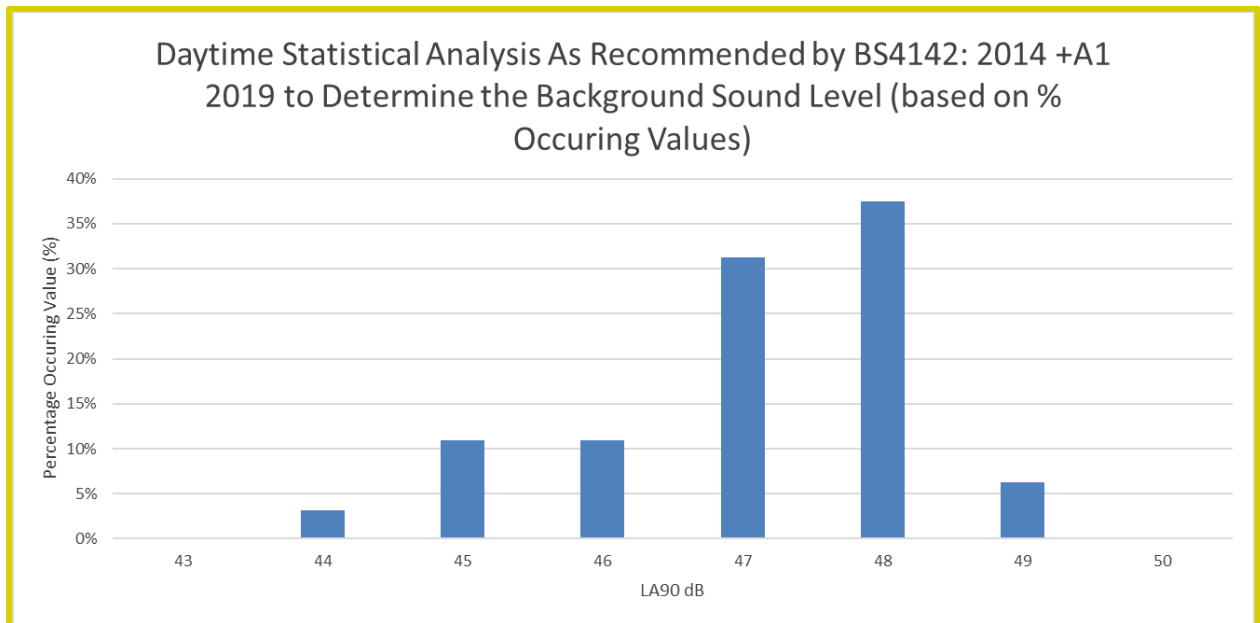


Figure 30: MP2 background noise data statistical analysis Saturday Night

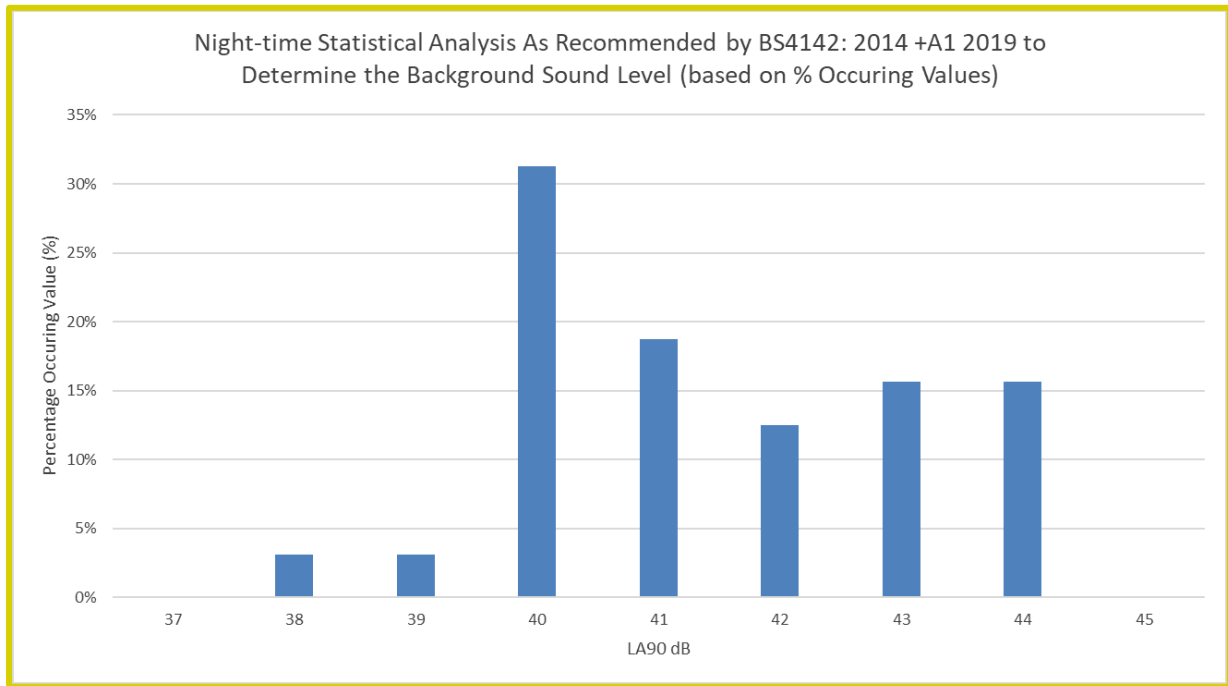


Figure 31: MP2 background noise data statistical analysis Sunday Day

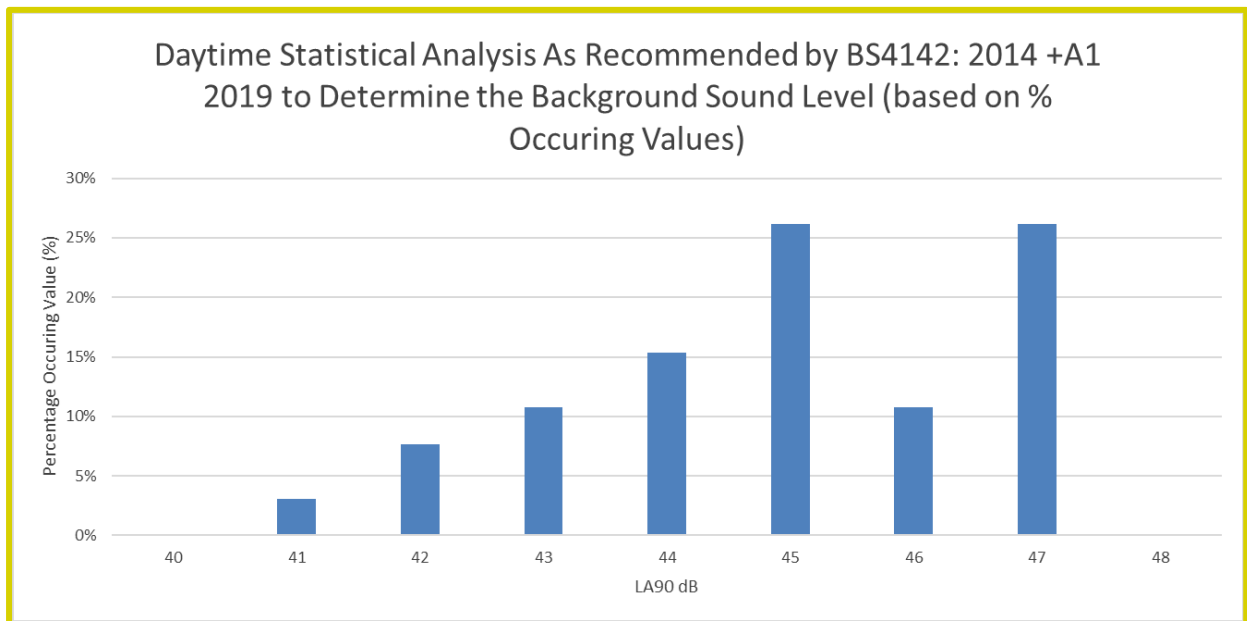


Figure 32: MP2 background noise data statistical analysis Sunday Night

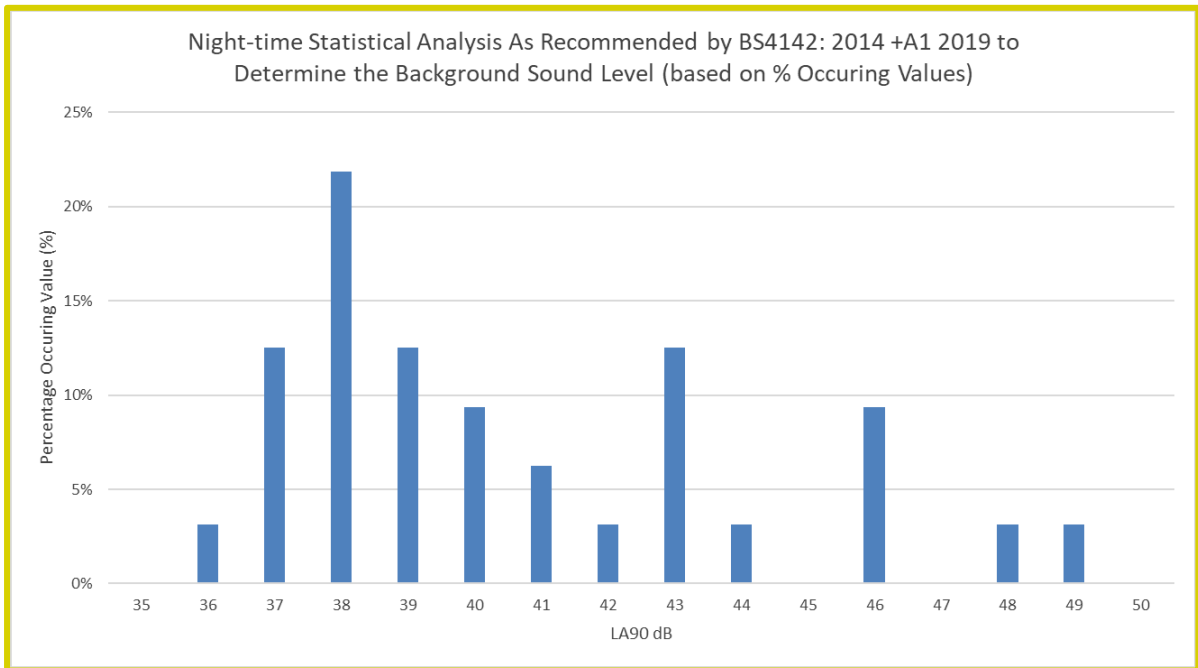
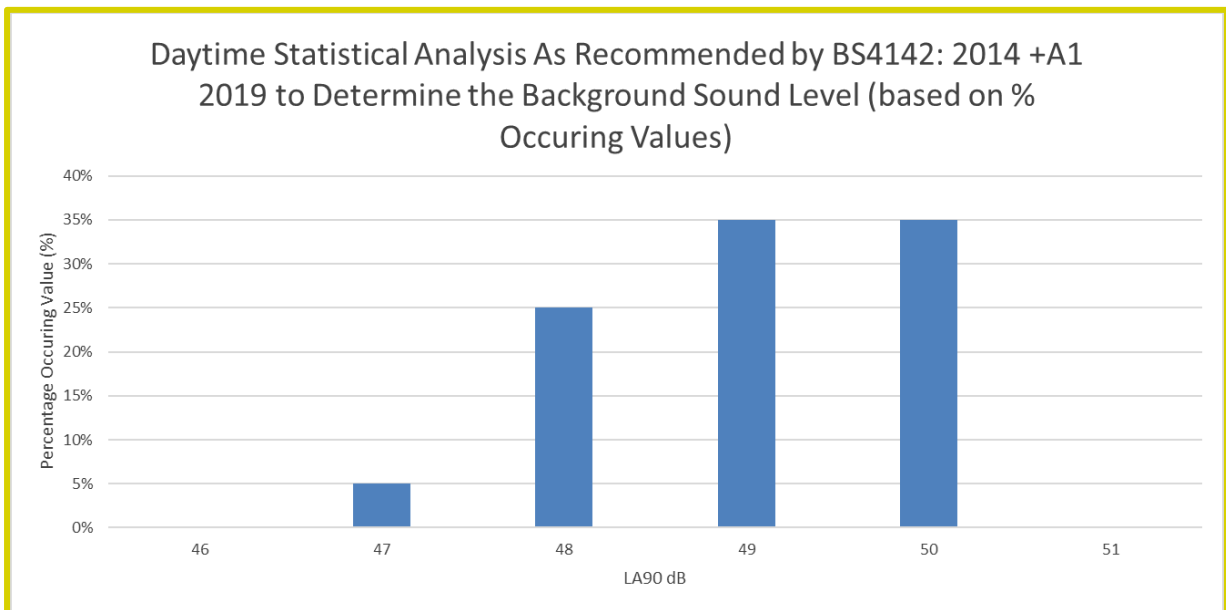


Figure 33: MP2 background noise data statistical analysis Monday Day



End of Report