

Gravesham Borough Council

Noise Assessment

Mid Kent Golf Club



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CONSULTING

Non-Technical Summary

What is Proposed?	Redevelopment and refurbishment works are proposed for the clubhouse at the existing Mid Kent Golf Club.
What is the Problem?	The introduction of new plant items has the potential to result in elevated noise exposure at neighbouring properties.
What is the Result?	Operational noise egress due to new plant items at the clubhouse is expected to be well below the existing background sound level. The likelihood of adverse comment with regard to noise is therefore considered low.
What are the Next Steps?	This report should be submitted to the local planning authority to support the planning application. However, as the assessment is based on a number of assumptions, it is recommended these checked once the design of the development has been progressed.

Report Record

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Client	Mid Kent Golf Club Limited
Report Type	Noise Assessment
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Report Revisions

Revision Ref	Date	Author	Details
1.0	23/05/22	SB	First issue for Client comment

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1.0 Introduction

- 1.1 Redevelopment and refurbishment works are proposed for the clubhouse at the existing Mid Kent Golf Club, located in Singlewell Road, Gravesend, Kent, DA11 7RB. Changes to the property due to the proposed works could have noise-related effects on nearby properties.
- 1.2 To assess the potential noise effects from the proposed development, a Noise Assessment has been undertaken. This report presents the findings of the Noise Assessment.

What is a Noise Assessment?

- 1.3 A Noise Assessment will determine if and to what extent existing or future noise sources could affect noise-sensitive receptors, and importantly, if those noise sources could have an adverse impact. If the Noise Assessment finds that the level of risk or impact is unacceptable, mitigation measures will need to be applied to the development.
- 1.4 The Noise Assessment will consider the prevailing sound environment to determine potential noise sources including traffic, footfall or other noise generating activities, such as mechanical plant, generators etc. The report will provide an impact assessment and give actionable recommendations. Recommendations may include solutions involving changes to design, layout and construction methods, so that the impacts from noise can be reduced to acceptable levels. Often these mitigation measures can be incorporated into standard construction practices. Find out more about how we undertake Noise Assessments including FAQ [here](#).
- 1.5 Understanding and reducing the impacts ensures that you have a safe and compliant site. When dealing with planning, the National Planning Policy Framework (NPPF) and associated policies require an appropriate noise assessment at the initial planning stage, whilst the ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development May 2017 requires delivery of sustainable development by promoting good health and wellbeing through the effective management of noise.

The Subject Site

Table 1 Site Details

Address	Singlewell Road, Gravesend DA11 7RB
Eastings, Northings	564670, 172346

- 1.6 The Mid Kent Golf Club site comprises an 18-hole golf course with associated driving range and clubhouse. The clubhouse is situated to the north of the site as indicated Figure 1 below. The area surrounding the golf course is of urban nature with residential properties surrounding the site.

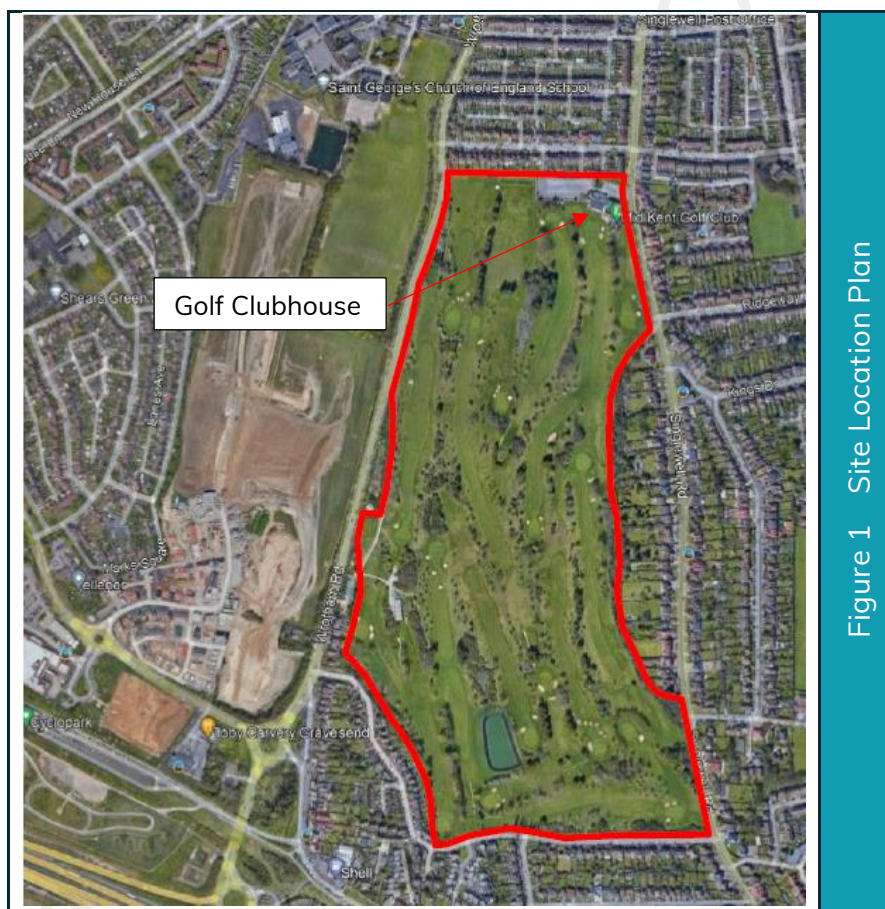
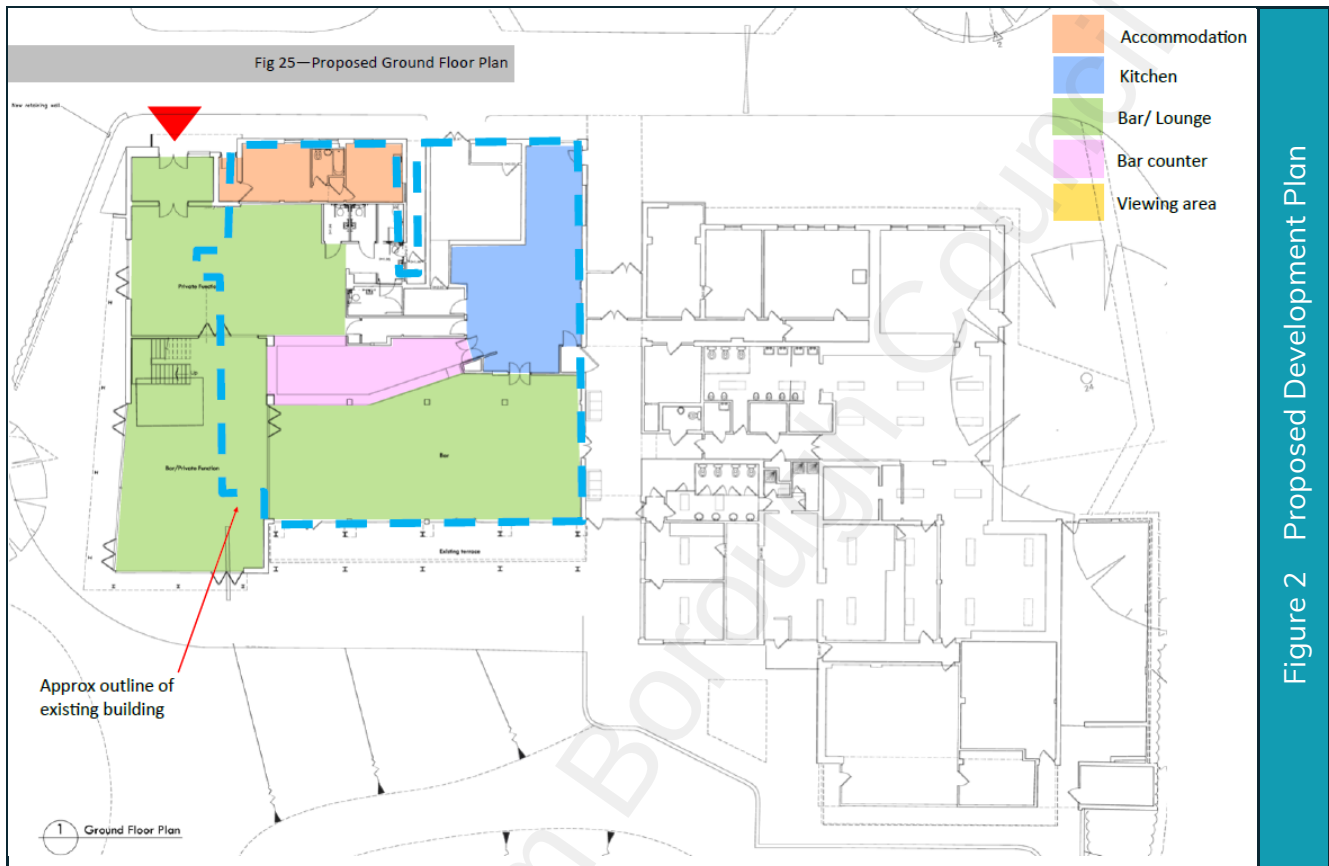


Figure 1 Site Location Plan

The Proposed Development

- 1.7 It is understood that the site is proposed to be redeveloped by reorganising the interior layout along with the addition of a two-storey extension to the western side of the building. Figure 2 shows the extent of the proposed development works.

- 1.8 As part of the redevelopment works, there is the potential for noisy items of plant such as air source heat pumps to be introduced. The exact location of such plant is not known at this stage of the design but is understood to be along the western side of the building.



The Objectives

- 1.9 It is understood that the proposed changes to the clubhouse will not result in a change to the number of members of the golf club. As such, the Noise Assessment will only consider the potential change in noise as a result on the introduction of new plant items.
- 1.10 The objective of this report is therefore to determine the existing noise environment at the noise sensitive receptors (NSRs) in vicinity of the clubhouse and to provide an indication of the likelihood of adverse noise impact.
- 1.11 Where (initial) assessment shows that there is a risk of adverse noise impacts, potential mitigating measures will be considered.



Report Structure, Limitations & Changes

- 1.12 The report structure generally follows the pollution linkage approach described above. Chapter 2 of the report sets out the assessment methodology. Chapter 3 discusses the baseline conditions, and Chapter 4 details the findings of the plant noise calculations. Report conclusions are set out in Chapter 5.
- 1.13 There are a lot of technical terms in this report and definitions are provided in Appendix A. Appendix B details some of the relevant policy and guidance that this assessment is based on, with acoustic criteria/thresholds set out in Appendix C. Extracts of survey data is provided in Appendix D.
- 1.14 This assessment has been undertaken in accordance with our Terms & Conditions. Full details on limitations and reliance are provided in those Terms. Third party information which has been reviewed and used to inform the assessments presented herein, including public records held by various regulatory authorities and environmental database data has been assumed to be true and accurate.
- 1.15 This assessment has been carried out to determine the potential risks posed to key receptors, based on the current development. Should revisions in the development proposals result in a change to any assessment parameters detailed in this report, a re-assessment of the risk should be carried out.



2.0 Assessment Methodology

Introduction

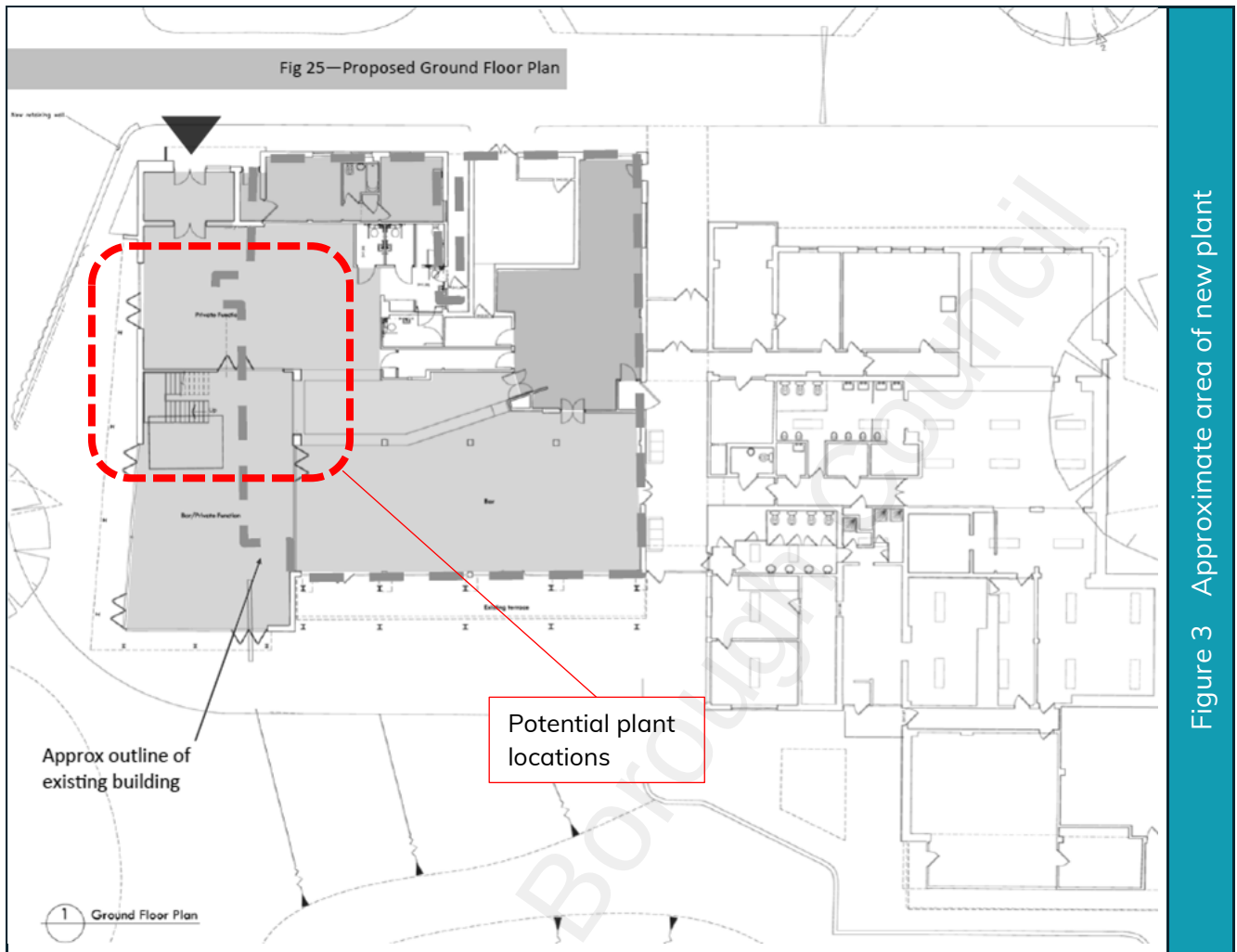
- 2.1 This chapter lists the target noise sources identified from a review of Google Earth / Street View, from any client or regulator information and from observations made during deployment of monitoring equipment / site visits. In addition, this section details the methodology for the noise monitoring equipment deployment and survey standards.
- 2.2 The proposed changes to the clubhouse are understood to not result in a change to the number of members of the golf club. The main existing noisy plant items, four condenser units and a kitchen extract fan, are also expected to remain the same or replaced with units similar to the existing ones. As such, only the potential change in noise as a result on the introduction of new plant items has been considered in this assessment.

Acoustic Criteria

- 2.3 The acoustic survey and noise impact assessment have been undertaken, under the co-ordination of a suitably trained and qualified consultant employed by Lustre, and with due regard to:
- ▶ BS 4142(2014)+A1(2019): Methods for rating and assessing industrial and commercial sound
 - ▶ BS 7445-1:2003: Description and measurement of environmental noise

Plant Noise

- 2.4 New plant items associated with the proposed refurbishment and extension are understood to be air source heat pumps, located towards the western side of the building as indicated in the figure below.



- 2.5 Whilst the exact plant items are yet to be specified, the Mitsubishi Ecodan air source heat pumps was identified as a suitable option. For the purpose of this assessment, noise data for this plant item has been used. The data are presented in Appendix E.
- 2.6 The assessment has considered two air source heat pumps working continuously and at full capacity.

Baseline Noise Survey

- 2.7 A long-term unattended baseline noise survey was undertaken from Thursday 14th April 2022 to Wednesday 20th April 2022 using a Norsonic Nor-140 precision Class I sound level meter (serial no. 1405197). The meter was set to log sound levels in contiguous 15-minute periods. A tripod was used to mount the microphone at an approximate height of 1.5 m in a

façade position facing south at approximately 1 m from a timber storage cabin. The approximate monitoring position is shown in the figure below.

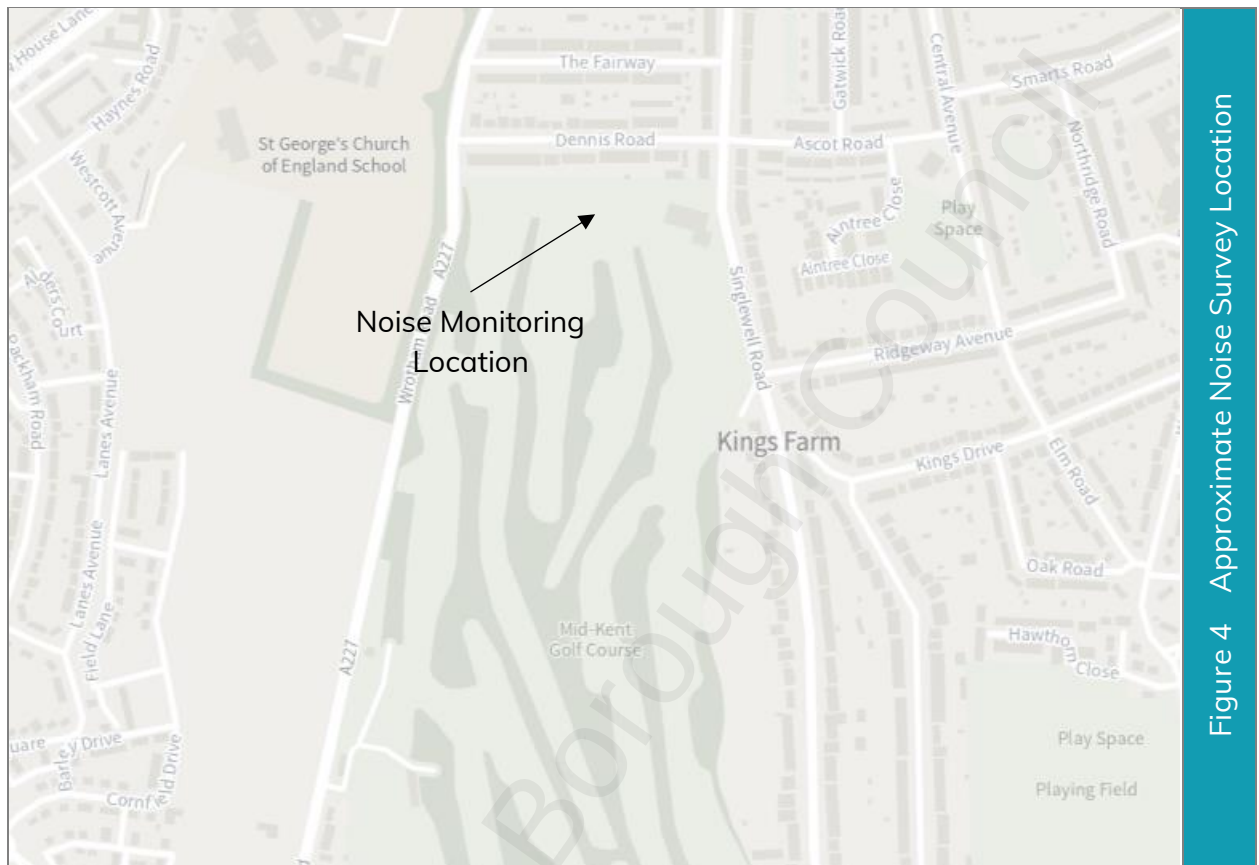


Figure 4 Approximate Noise Survey Location

- 2.8 Pre- and post-survey calibration checks were carried out which confirmed that no significant drift had occurred.
- 2.9 The noise environment at the measurement position is considered representative of the surrounding area.
- 2.10 A sample of the graphical survey data is available in Appendix D, with full data available if required upon request.

Meteorological Conditions

- 2.11 Meteorological conditions during the measurement period were in line with recommendations for environmental noise surveys, with minimal wind (<5m/s) during the survey. An air temperature between 6°C and 22°C was noted during the survey. The cloud cover varied between partial to mostly sunny during the survey. The meteorological conditions are not considered to have affected the measurement results.



3.0 Noise Survey Results

Existing Noise Environment

- 3.1 The main and constant source of noise at the time of the site visits was observed as traffic noise from the A227 Wrotham Road and also, but to a lesser extent, the A2 motorway. Occasionally, nearby noise from users of the golf course was also noted.
- 3.2 Noise from the clubhouse was not noticeable at the measurement position, even during a busy and sunny Thursday afternoon when the sound level meter was set up.

Summary of Measured Levels

- 3.3 The baseline noise level measurement results and derived values are presented below in Table 2. Note that the night-time is taken as the 23:00 to 07:00 period.

Table 2 Summary of Baseline Noise Levels					
Period		Noise level (dB)			
		$L_{Aeq}^{[1]}$	L_{AFmax} (range)	L_{A10}	$L_{A90}^{[2]}$
Weekday	Day	52	50 – 97	50	42
	Night	49	43 – 85	47	35
Weekend	Day	50	53 – 87	50	43
	Night	50	49 – 78	50	41
Notes: [1] Logarithmic average over denoted period, [2] Typical value derived in line with BS 4241 methodology					

- 3.4 As can be seen from the above results, the ambient noise levels (L_{Aeq}) are very consistent between the weekday and weekend periods. With the exception of the weekday night-time values, the background sound levels (L_{A90}) are also consistent.
- 3.5 As mentioned previously, no noise from the existing clubhouse plant was audible at the time of the survey. It is unclear if this could change during warmer or cooler conditions. There was no suggestion from the data that the survey equipment had been disturbed or any erroneous intrusion not related to noise environment that was being evaluated. In addition, the meteorological conditions are not considered to have affected the measurement results.



4.0 Plant Noise Levels and Discussion

- 4.1 The project is at an early design stage to support the Planning Application and therefore no M&E design was available for undertaking this assessment. However, it is understood that the main existing plant, consisting of an extract fan and several condenser units, will remain largely the same. The noise egress from these units is therefore expected to remain similar but it is recommended the details are forwarded to Lustre Consulting for confirmation when available.
- 4.2 In terms of new plant, it is understood that heating will be provided by means of air source heat pump(s), located to the west of the clubhouse. The nearest and most exposed noise-sensitive receptors are the rear gardens of the dwellings in Dennis Road just north of the clubhouse. The distance to the nearest receptor is estimated at 50 m.
- 4.3 Plant associated with the clubhouse are only anticipated to be operational during daytime hours. The background noise level of 42 dB L_{A90} is considered representative of this period.
- 4.4 Following BS 4142 guidance and assuming a conservative 5 dB penalty (2 dB for slight tonality and 3 dB for intermittency), a plant noise rating level limit of 37 dB $L_{Ar,Tr}$ is considered appropriate.
- 4.5 Calculations show that worst-case noise levels of 27 dB(A) can be expected at the nearest noise-sensitive receptor, assuming constant operation at full capacity. This noise level is 15 dB below the typical background sound level (10 dB below the noise rating level limit) which is sufficiently low to not contribute to the existing noise environment and is also considered a positive indication of low impact.
- 4.6 Nevertheless, it is recommended that once the design has been progressed and the new plant items confirmed, the details are checked to ensure the conclusions of this report are still valid.



5.0 Conclusions & Next Steps

- 5.1 Redevelopment and refurbishment works are proposed for the clubhouse at the existing Mid Kent Golf Club. The proposed development has the potential to result in excessive noise, hence a noise assessment has been undertaken to evaluate this risk.
- 5.2 Assessment of the prevailing environmental noise conditions has been undertaken over what is deemed to have been a typical week and weekend period, with the main noise source identified as traffic noise from the A227 Wrotham Road and the A2 motorway.
- 5.3 In terms of future operational noise, the main existing noise sources are expected to remain the same or be replaced with similar units. The number of members of the Mid Kent Golf Club is also understood to not be affected by the proposed development. As such, this noise assessment has been carried out with respect to potential daytime noise from new plant items only.
- 5.4 The assessment has shown that worst-case plant noise egress from the Mid Kent Golf Club would be well below the existing daytime ambient sound level at the nearest noise-sensitive receptor. The new noise sources are therefore not expected to contribute to the existing ambient noise environment.
- 5.5 In terms of the BS 4142 assessment, the noise rating level associated with worst-case operation of the new plant would be around 10 dB below the daytime background sound level. This is a positive indication that the likelihood of adverse comment would be low.

Planning Considerations & Next Steps

- 5.6 This report should be provided to the Local Planning Authority to support the Planning Application.
- 5.7 As this assessment is based on a number of assumptions, it is recommended that once the design has been progressed, the plant details are checked to ensure the conclusions of this report are still valid.

APPENDIX A: Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20×10^{-6} Pascals).
Sound Pressure Level (Lp)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (LA or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T This is the sound level that is equivalent to the average energy of noise recorded over a given period.
L_{Amax} L_{A90}	The A-weighted maximum instantaneous noise level. The A-weighted statistical noise level which is exceeded 90% of the given measurement period. This level is usually synonymous with the background sound pressure level and generally describes the underlying level of sound that is experienced when specific events are not taking place.
R_w	The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz. The higher the value, the greater the sound insulation, and the more onerous the requirement.
$D_{n,ew}$	The weighted (w) element (e) normalised (n) level difference (D), an indicator of the ability of a small building element (such as a trickle ventilator) to reduce sound in a particular frequency band. The higher the value, the greater the sound reduction, and vice versa.

APPENDIX B: Planning Policy Guidance

NATIONAL PLANNING POLICY FRAMEWORK, 2021 (NPPF)

The National Planning Policy Framework (NPPF) includes the following statements relating to noise and the requirement to take it into account in the planning process.

Section 15, paragraph 170 (e) of NPPF states:

- 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.

Section 16, paragraph 180 of NPPF states:

- (a) mitigate and reduce to a minimum potential adverse impact 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;

Paragraph 182 of NPPF further elaborates on the consideration of existing businesses, as follows:

- 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.

The NPPF does not provide absolute limits on noise that are acceptable or unacceptable in a given situation. It does, however, set out the "need to ensure that developments do not give rise to significant adverse impacts on health and the quality of life". In addition, the operations of existing businesses are also protected, with reference to ensuring new developments do not have an adverse effect on their operations.

NOISE POLICY STATEMENT FOR ENGLAND, 2010 (NPSE)

The Noise Policy Statement for England (NPSE) applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The Government recognizes that the effective management of noise requires a coordinated and long-term approach that encompasses many aspects of modern society.

The long-term vision of Government noise policy is set out 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. This long-term vision is supported by three aims:

- ▶ 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.

The NPSE introduces the concept of NOEL, LOAEL and SOAELs, which are described below:

- ▶ NOEL – No Observed Effect Level – This is the level below which no observable effect can be detected.
- ▶ 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 effects on health and quality of life can be detected.

PLANNING POLICY GUIDANCE – NOISE, 2014

This guidance is provided online within the UK Government Planning System. The guidance expands upon the concepts of Observed Effect Levels and the following table is provided.

Planning Policy Guidance - Noise exposure hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Outcome
No Observed Effect Level			
Not Noticeable	No Effect	No Observable Effect	No specific measures required
Noticeable but not Intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area, but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, 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 perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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	Significant Observed Adverse Effect	Avoid

	awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.		
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

ProPG: PLANNING & NOISE PROFESSIONAL PRACTICE GUIDANCE ON PLANNING & NOISE NEW RESIDENTIAL DEVELOPMENT MAY 2017

The primary goal of ProPG is to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise.

ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. It is envisaged that following the guidance contained in this document will increase the likelihood of success of planning applications for new residential development, yet it also provides a clear basis for recommending refusal of new housing development on noise grounds where necessary.

Stage 1: Initial Site Noise Risk Assessment

An initial noise risk assessment of the proposed development site should be conducted by a competent noise practitioner at the earliest opportunity, before any planning application is submitted. The noise risk assessment should provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal. It should indicate whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.

Stage 2: Full Assessment – the four key elements

- ▶ Element 1 – Good Acoustic Design Process Stage 2:
- ▶ Element 2 – Internal Noise Level Guidelines Stage 2:
- ▶ Element 3 – External Amenity Area Noise Assessment Stage 2:
- ▶ Element 4 – Assessment of Other Relevant Issues

Figure: Summary plan for ProPG planning advice

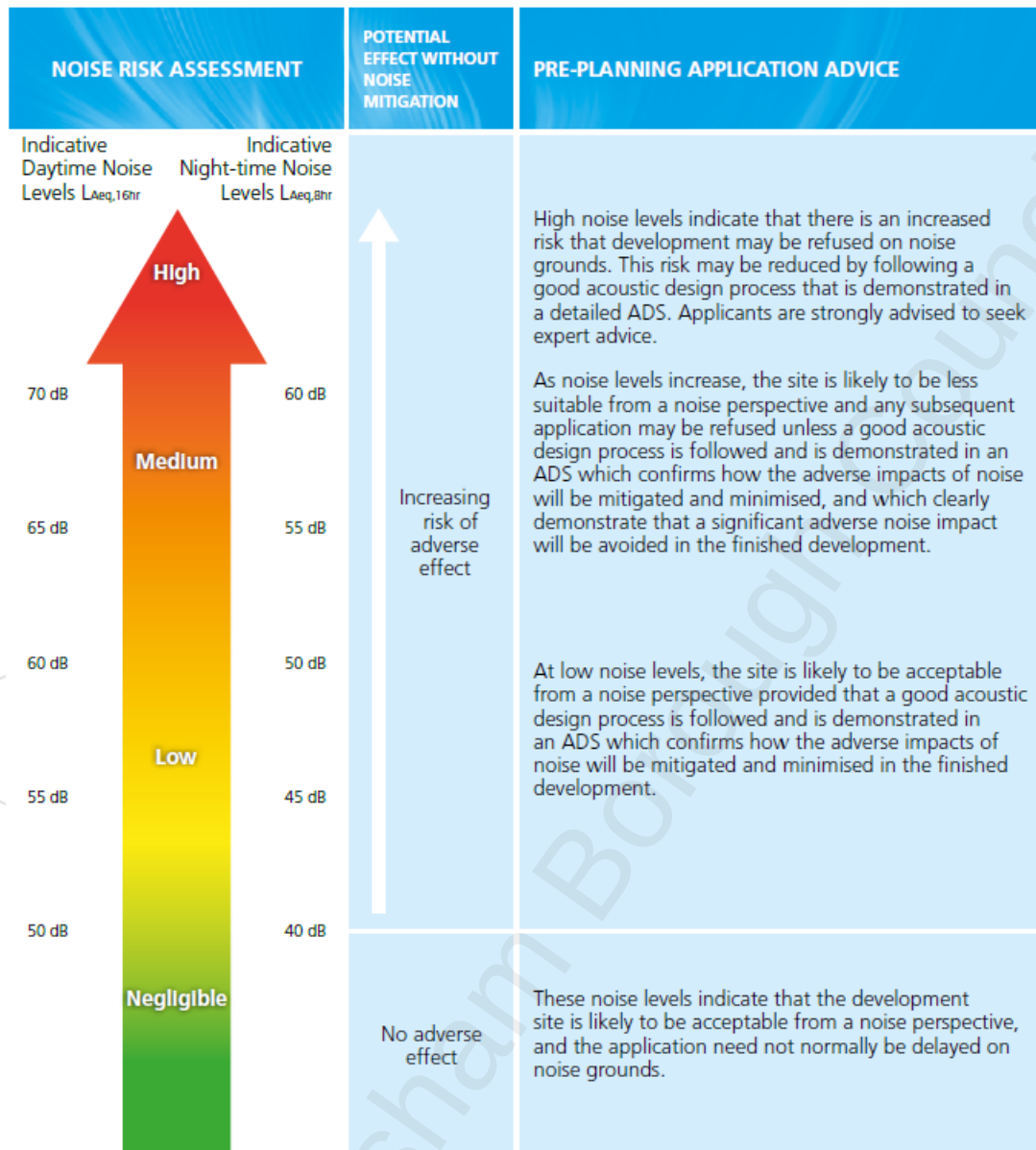


Figure 1 Notes:

- Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.
- Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".
- $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.
- An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F} > 60$ dB means the site should not be regarded as negligible risk.

Gravesham Local Policy

Gravesham Borough Council's policy on noise from new development is set out in Part 2: Draft Development Management Policies Document of the Local Plan. Proposed Policy AM5 deals specifically with noise. An extract of the policy is shown below.

Proposed Policy AM5: Noise and Vibration

- 10.5.9. Proposals for development generating noise and/or vibration that may impact upon sensitive receptors or be impacted on by existing or potential sources of noise and/or vibration must be supported by a noise/vibration assessment prepared by a suitably qualified person in accordance with best practice.
- 10.5.10. The assessment will be required to demonstrate in full that either the noise and/or vibration impacts are acceptable without mitigation or how impacts will be mitigated through design or other means to make them acceptable and how those measures will be delivered.
- 10.5.11. Planning permission will only be granted where:
- In the case of development that may generate noise or vibration, that resulting impacts on sensitive receptors due to noise and/or vibration are acceptable both during the construction and operational phases of the development and in combination with other sources of noise and/or vibration; or
 - In the case of the introduction of a sensitive receptor into an area already subject to noise or vibration, that this is unlikely to result in a complaint or the curtailment of existing lawful activity causing that noise or vibration and that a high standard of amenity for existing/future occupiers of the proposed development can be achieved.

APPENDIX C: Acoustic Criteria

The following British Standards and Building Regulations have been considered and adhered to in this assessment.

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

BS 4142:2014 describes methods for determining and assessing noise levels from noise sources with a view to determining the likelihood of adverse impact.

The document has been developed for the purposes of:

- ▶ investigating complaints,
- ▶ Assessing sound from proposed new, modified or additional sources of sound of an industrial and / or commercial nature; and
- ▶ Assessing sound at proposed new dwellings or premises used for residential purposes.

The document is now suitable for the determination of noise nuisance. Furthermore, that standard is not intended to apply to the following sources of noise:

- ▶ recreational activities, including all forms of motorsport;
- ▶ music or other entertainment;
- ▶ shooting grounds;
- ▶ construction and demolition;
- ▶ domestic animals;
- ▶ people;
- ▶ public address systems for speech;
- ▶ other sources falling within the scopes of other standards or guidance.

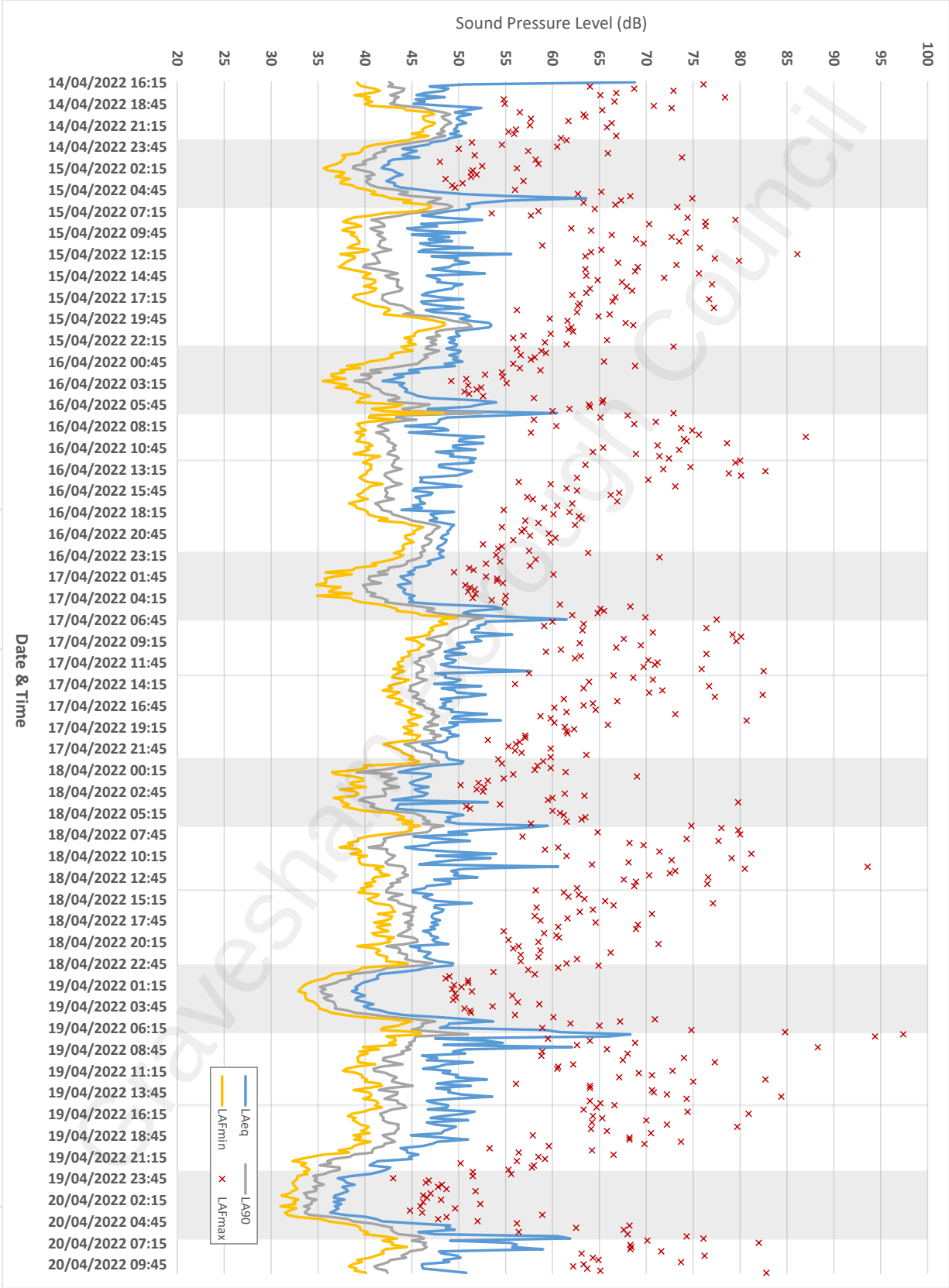
The methodology requires the determination of the specific sound level, corrected for characteristic feature in order to produce a rating level. The rating level is then compared against the background noise level (expressed as $L_{A90,T}$), thereby producing an 'excess of Rating over background sound level' figure. This figure is then used for assessment of likelihood of adverse impact.

The standard places great emphasis on the context of the sound environment that is being assessed and the development overall. This is an essential part of the assessment process, particularly when predicting likelihood of adverse impact. However, for guidance the following is included in the standard:

- ▶ Typically, the greater the difference, the greater the magnitude of the impact;
- ▶ A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- ▶ A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- ▶ The lower the rating 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. When 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.

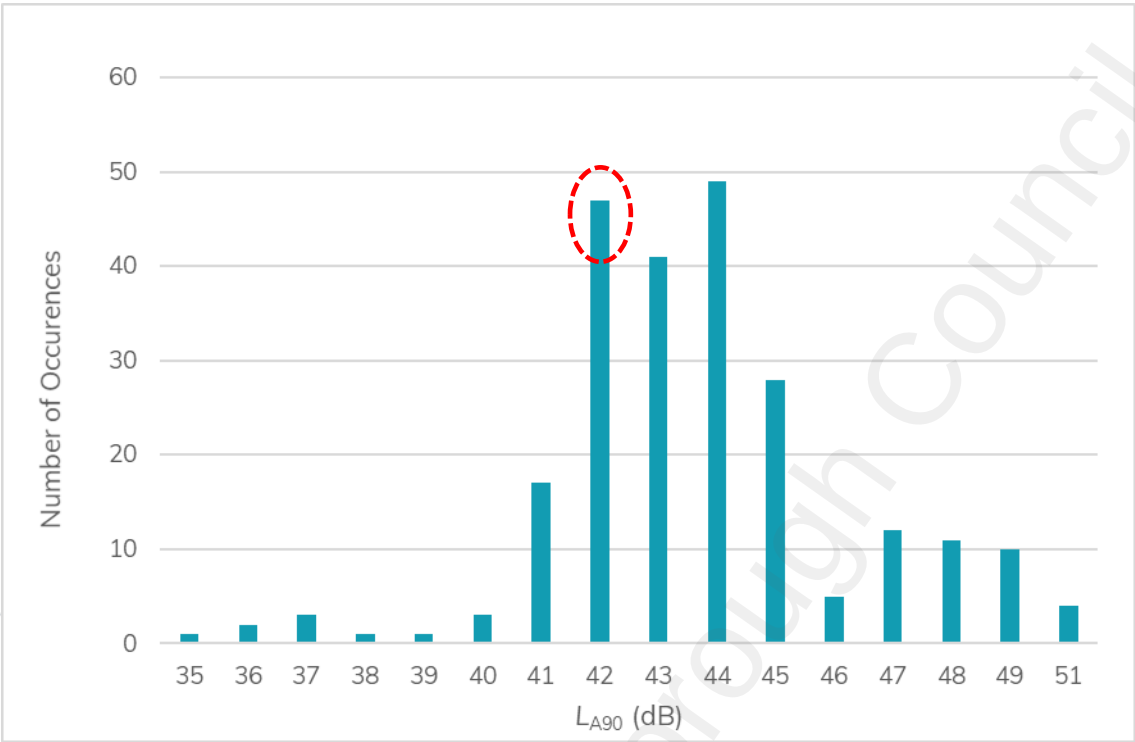
APPENDIX D: Survey Data and Analysis

Baseline Noise Data

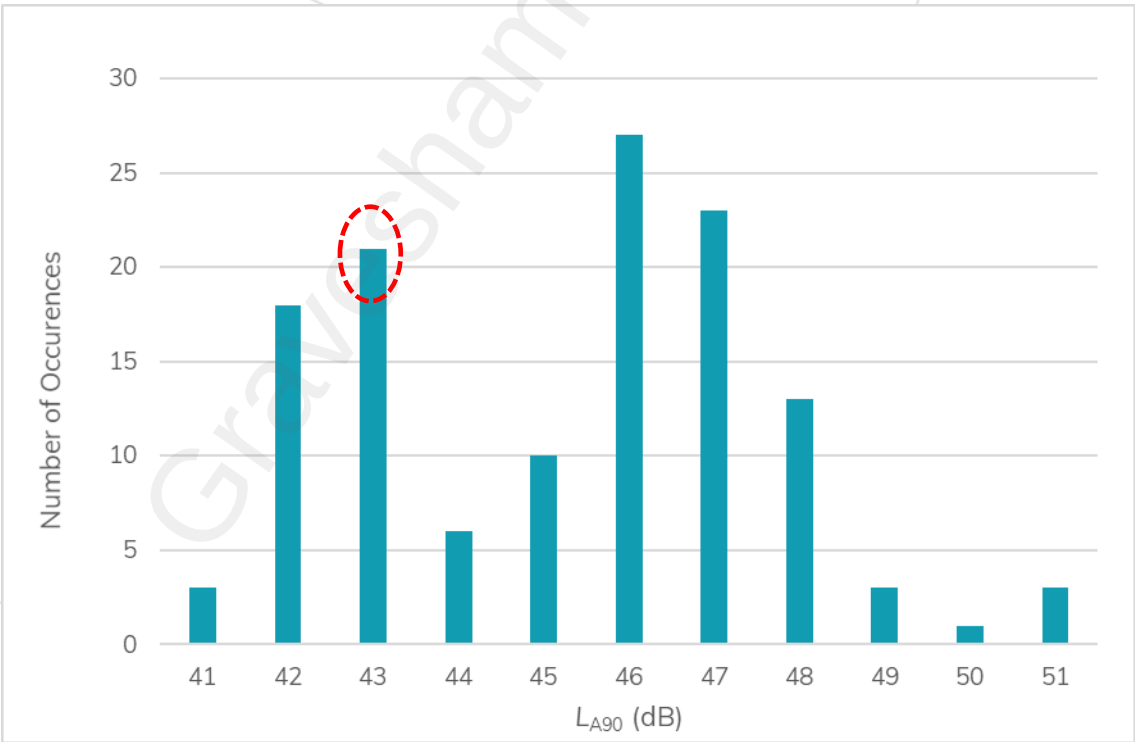


Background Noise Data Analysis

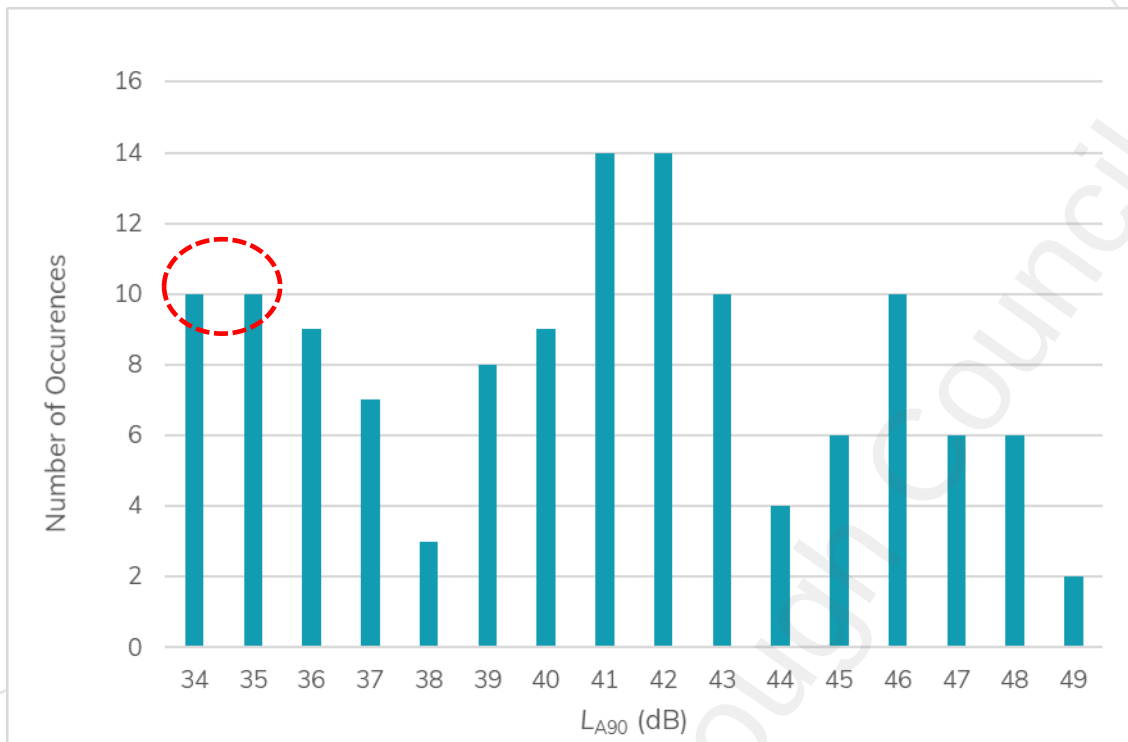
Weekday – Daytime



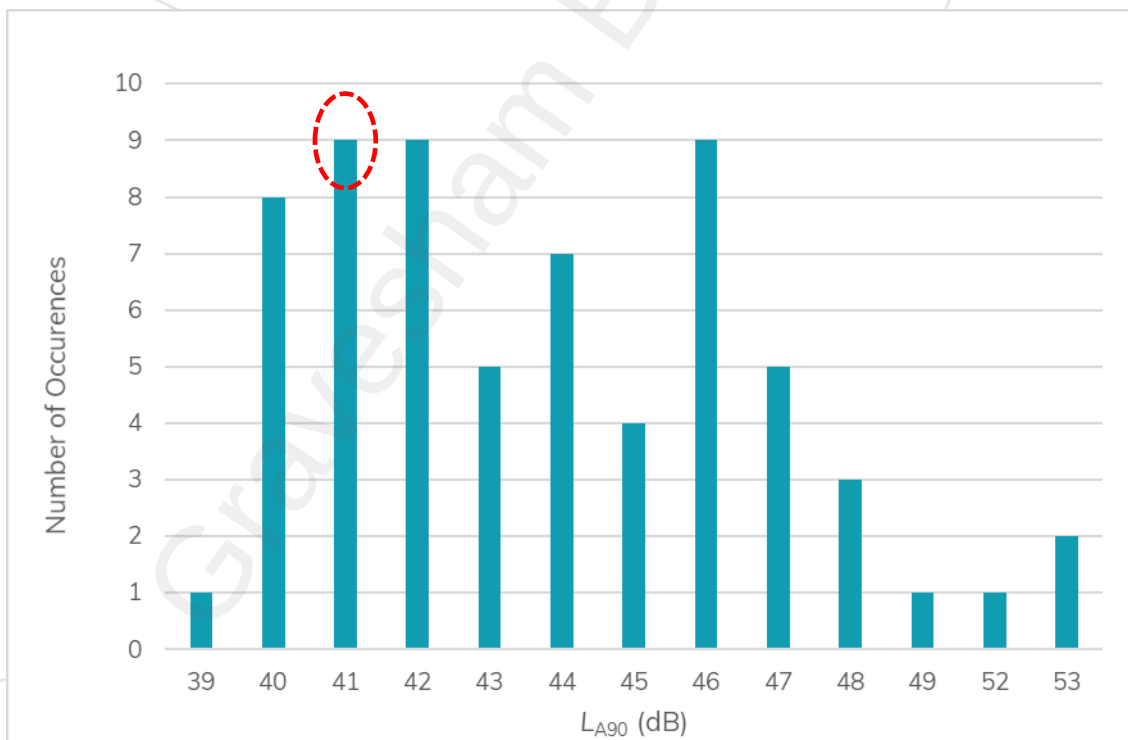
Weekend – Daytime



Weekday – Night-time



Weekend – Night-time



APPENDIX E: Plant Data

Heating

Product Information

CAHV-P500YB-HPB

Ecodan Air Source Heat Pump

Making a
World of
Difference

MODEL		CAHV-P500YB-HPB
HEAT PUMP SPACE HEATER - 55°C	ErP Rating	A++
	$\eta_{s,h}$	125%
	SCOP	3.19
HEAT PUMP SPACE HEATER - 35°C	ErP Rating	A+
	$\eta_{s,h}$	139%
	SCOP	3.54
HEATING*1 (A-3/W35)	Capacity (kW)	42.6
	Power Input (kW)	15.2
	COP	2.80
OPERATING AMBIENT TEMPERATURE (°C DB)		-20~+40°C
SOUND PRESSURE LEVEL AT 1M (dBA)*2,3		59
LOW NOISE MODE (dBA)*2		Variable
FLOW RATE(l/min)		126
WATER PRESSURE DROP (kPa)		18
DIMENSIONS (mm)	Width	1978
	Depth	759
	Height	1710 (1650 without legs)
WEIGHT (kg)		526
ELECTRICAL SUPPLY		380-415v, 50Hz
PHASE		3
NOMINAL RUNNING CURRENT [MAX] (A)		17.6 [52.9]
FUSE RATING - MCB SIZES (A)*4		63

*1 Under normal heating conditions at outdoor temp: -3°CDB / -4°CWB, outlet water temp 35°C, inlet water temp 30°C

*2 Under normal heating conditions at outdoor temp: 7°CDB / 6°CWB, outlet water temp 35°C, inlet water temp 30°C as tested to BS EN14511

*3 Sound power level of the CAHV-P500YB-HPB is 70.7dBA. Tested to BS EN12102

*4 MCB Sizes BS EN60898-2 & BS EN60947-2

$\eta_{s,h}$ is the seasonal space heating energy efficiency (SSHEE) $\eta_{w,h}$ is the water heating energy efficiency



LUSTRE
CONSULTING

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