



PLANT NOISE ASSESSMENT

HILLINGDON HOSPITAL

Hillingdon Hospitals NHS

2063804-RSKA-RP-001-(02)





General notes

Project Name:	Hillingdon Hospital
Title:	Plant Noise Assessment
Client:	Hillingdon Hospitals NHS
Issue Date:	01 May 2026
Report No.	2063804-RSKA-RP-001-(02)

Revision:	Description:	Author(s):	Reviewer:	Date:
01	First Issue	Justine Wade	Matthew White	20 April 2026
02	Updated Mechanical Mitigation	Justine Wade	Matthew White	01 May 2026

Author(s): Justine Wade

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Signature:

Date: 30 April 2026

Date:

01 May 2026

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Acoustics Ltd.



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1 Introduction

1.1 Rationale for Acoustic Surveying Works

It is understood that a SDEC Plant relocation is proposed at Hillingdon Hospital, Pield Heath Rd, Uxbridge UB8 3NN. As such, a plant noise assessment is required to demonstrate no adverse impact arising from noise emissions resultant from the new mechanical plant to noise sensitive receptors. The site falls within the jurisdiction of Hillingdon London Borough Council.

The noise assessment is informed by a baseline survey and focuses on the effects of operational noise from the proposed development.

A glossary of acoustic terms used within this report is appended to this document.

1.2 Objectives

The objectives of the assessment are to:

- Summarise the prevailing baseline conditions at the closest residential receptors to the plant;
- Predict the noise contribution of the relocated plant at nearest noise sensitive receptors;
- Assess the impact of the plant during most sensitive hours against the design targets based on local and national guidelines/policies; and
- Quantify and suggest, where appropriate, the level of reduction to achieve compliance with British Standards, guidance and local targets.

1.3 Exclusions

Given the separation distance between the plant and the nearest existing receptors, an assessment of operational induced vibration levels has been discounted.



2 Regulatory Framework

2.1 National Planning Policy Context

National planning policy is governed by the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE) and Planning Practice Guidance (PPG).

Summaries are provided in Appendix A.

2.2 British Standard 4142: 2014 + A1: 2019 'Methods for rating and assessing industrial and commercial sound'

BS 4142 describes the methods for rating and assessing noise from industrial or commercial sources, including manufacturing processes, fixed installations and plant equipment, loading of goods and sound from mobile plant. The standard is applicable for the purpose of assessing sound at proposed new dwellings, through the determination of a rating level of an industrial or commercial noise source.

Where certain acoustic features are present at the assessment location, a character correction should be applied to the specific sound level to give the rating level to be used in the assessment.

- 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 adverse impact depending on the context.
- 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.

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

- The absolute level;
- The character and level of the residual sound;
- The sensitivity of the receptor and whether dwellings will already (or likely) to incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as: i) façade insulation treatments, ii) ventilation and/or cooling, and iii) acoustic screening.

2.3 Hillingdon London Borough Council – Local Plan: Part 1 Strategic Policies (Adopted 2012)

The Local Plan issued by Hillingdon London Borough Council states within Core Policies – Environmental Improvement:

“8.138 Noise: *Guidance has already been set out at the national level by the NPPF. This guidance sets out clear rationale as to where sensitive development should be located in relation to existing noise/pollution sources, and also provides guidance on where potentially noise polluting development should be located.*

...

Policy EM8: Land, Water, Air and Noise – *The council will investigate Hillingdon’s target areas identified in the Defra Noise Action Plans, promote the maximum possible reduction in noise levels and will minimise the number of people potentially affected.*

The council will seek to identify and protect Quiet Areas in accordance with Government Policy on sustainable development and other Local Plan policies.



The council will seek to ensure that noise sensitive development and noise generating development are only permitted if noise impacts can be adequately controlled and mitigated."

2.4 London Borough of Hillingdon SPD – Development Control for Noise Generating and Noise Sensitive Development. (Adopted 2014)

Table 2 within Section 6.2 of Hillingdon's Noise Supplementary Planning Document presents the typical criteria imposed on the external noise emissions associated with new noise generating industrial and commercial developments.

Noise Impact from Relevant Proposed Industrial or Commercial Premises or Plant	Development Outcome
Rating Level ($L_{Ar,Tr}$) is at least 5 dB(A) below the Background Level L_{A90}	Normally acceptable
Rating level ($L_{Ar,Tr}$) is no more than 5 dB(A) above the Background Level L_{A90}	Acceptable only if there are overriding economic or social reasons for development to proceed
Rating level ($L_{Ar,Tr}$) is more than 5 dB(A) above the Background Level L_{A90}	Normally unacceptable
Note: All terms as defined in BS 4142:2014+A1:2019	

Table 1 Hillingdon Noise SPD Table 2

Section 6.4 of the SPD 'Desktop Assessment' details the requirements of a desktop plant assessment in order to meet the Local Authority's criteria:

"The applicant will have to achieve either of the following requirements

- 1. MCS Planning Standards for permitted development installations air source heat pumps on domestic premises or*
- 2. Assume at least 5 dB below background criteria to achieve compliance based on a daytime & night time background of 45 & 35 dB L_{A90} respectively.*

The report will have to include:

- 1. The location of the nearest residential window that may be affected by noise from the proposed plant.*
- 2. Indicate the distance of the window from the source in metres and any natural barrier or shielding to the noise path.*
- 3. The proposed operational hours of the plant,*
- 4. The assumed background noise level assessment (L_{A90} 15 minutes) over the proposed hours of operation. (daytime 45 dB(A), night time 35dB(A))*
- 5. Manufacturers noise specifications of plant: Sound Power/Sound pressure Level, octave band spectral levels.*
- 6. Calculations for the predicted noise level 1 metre from the window of the nearest residential property. Include any proposed attenuation measures."*

2.5 Healthcare Technical Memorandum 08-01: Acoustics

Healthcare Technical Memorandum 08-01: Acoustics (HTM 08-01) provide acoustic design guidance for healthcare buildings. Table 2 of HTM 08-01 'Criteria for internal noise from mechanical and electrical services' provides a list of various noise-sensitive spaces alongside criteria for internal noise arising from mechanical



and electrical services, including criteria for wards. As such, this criteria shall be used to assess the impact of proposed plant at the overlooking wards.

Regarding the categorisation of external plant noise as mechanical and electrical services, as opposed to intrusive noise from external noise sources (for which criteria is also specified separately), the following is stated within the document:

'The intrusive noise criteria do not include plant noise from adjacent hospital buildings. This should be considered as mechanical service noise.'

2.6 Local Authority Consultation

Once formally instructed, RSKA began the consultation process with the planning department at Hillingdon London Borough Council via email on the 10th February 2026. This email detailed RSKA's proposed approach to the survey and assessment.

The proposed assessment methodology included:

- Derivation of typical background levels from a baseline noise survey carried out by RSKA at locations representative of the nearest noise sensitive receptors to the proposed plant installation in order to establish the existing noise levels. The survey would consist of unattended noise measurements for a continuous monitoring period of up to 1-week comprising of environmental noise measurements (background and ambient).
- An assessment to the requirements of BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'*.

A response was received from Mr. Richard Buxton (Planning Information Officer at Hillingdon Brough Council) on 11 February 2026. No additional comments were received within this response, confirming the acceptability of the proposed methodology.

2.7 Adopted Plant Noise Limits

Following the above, Table 2 details the proposed plant noise emission limits to be applied at noise sensitive receptors. The noise limits for wards has been based on Noise Rating (NR) level criteria from HTM 08-01.

Criterion	Location	Limit at noise-sensitive receptors, $L_{A,T,r}$ (dB) or NR	
		Daytime Hours (07:00-23:00)	Night Hours (23:00-07:00)
Plant noise emissions	Off-site noise-sensitive receptors	5 dB below representative measured daytime $L_{A90,1\text{hour}}$	5 dB below representative measured night $L_{A90,15\text{mins}}$
	On-site noise-sensitive receptors	Wards – NR30 (internally within wards)	

Table 2 Proposed plant noise emission limits



3 Development and Location

3.1 Site Description

The site of the proposed development and surrounding area is illustrated within Figure 1 below.



Figure 1 Site and wider surroundings – approximate site boundary illustrated by dashed red line

Hillingdon Hospital is located within a residential area to the south of Uxbridge, west London.

The local noise environment is dominated by the surrounding road network (Pield Health Road to the north, Royal Lane to the west and Colham Green Road to the east) with noted aircraft noise from Heathrow airport, situated at 5.2 km to the south of the hospital.

The proposed location for the Plant is on the rooftop of the same day emergency care unit. The site and surrounding noise sensitive receptors are illustrated in Figure 2.



A description of the immediate surrounding area is detailed below:

- North – Pield Heath Road is a well trafficked road leading to a plethora of residential and commercial properties.
- East – Residential and commercial properties alongside Colham Green Recreation Ground.
- South – Residential properties along with Violet Avenue Childrens Playground.
- West – Royal Lane is a road serving as an artery for traffic, branching off into smaller residential access roads.

The nearest noise sensitive receptors to the proposed installation location of the SDEC Plant are detailed within Table 3 below.

Ref.	NSR Name	Distance from proposed plant (m; dir.)	What3Words
NSR1	Pield Heath Rd Residences	48m North	///area.scores.deeply
NSR2	Windows at Hillingdon Hospital	18m South	///zone.quit.scenes

Table 3 NSR Locations

RSK Acoustics assumes that if noise compliance is achieved at the noise sensitive receptors listed above, further surrounding receptors will be adequately screened.

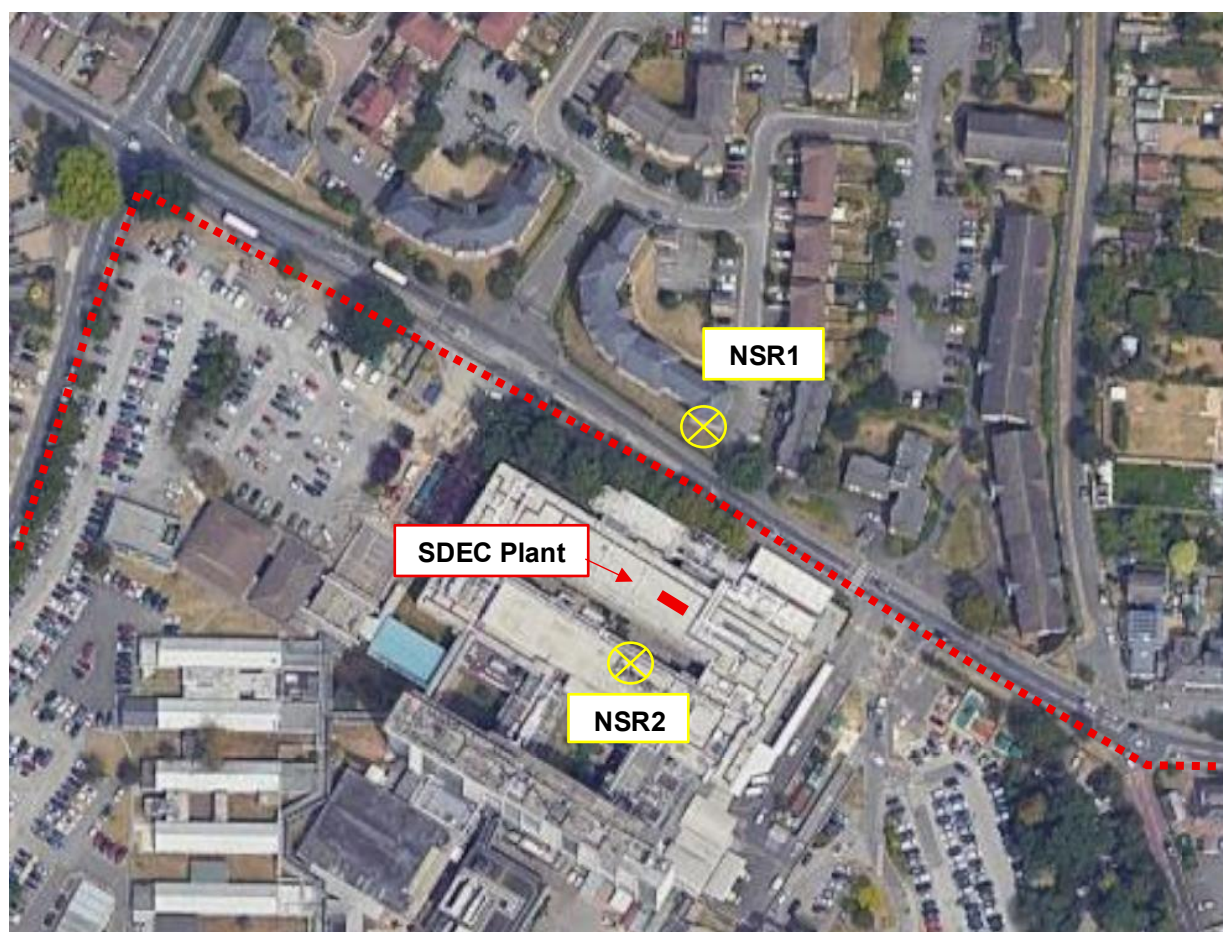


Figure 2 Site location and nearest noise sensitive receptors



4 Noise Survey Methodology

4.1 Baseline Measurement Details

Baseline Noise Measurements were undertaken Monday 15 to Monday 22 April 2024 in addition to supplementary noise measurements undertaken Wednesday 11 to Tuesday 17 February 2026. Noise levels were obtained along Pield Heath Road and Royal Lane providing representative baseline levels from the surrounding residential receptors.

A description of the measurement positions and rationale are provided in Table 4

ID	Type*	OSGB Coordinates	Rationale
MP1	U	51.5265, -0.4608	Approximately 1.5 metres above ground level at the northern site boundary of Hillingdon Hospital adjacent to Pield Heath Road.
MP2	U	51.5256, -0.4639	Approximately 1.5 metres above ground at the western site boundary of Hillingdon Hospital adjacent to Royal Lane.
* U - Unattended			

Table 4 Unattended measurement location details

A graphical representation of the monitoring positions in the context of the surrounding sensitive receptors is presented in Figure 3 below with site photographs in Appendix B.



Figure 3 Noise survey measurement positions



The existing noise climate was dominated by road traffic noise at both MP1 and MP2 locations, with existing hospital building services plant noise also audible.



5 Noise Survey Results

5.1 Baseline Monitoring

A summary of the measured baseline noise levels at monitoring locations MP1 and MP2 are presented in Table 5 and Table 6

Date	Time Period, T	MP1 – Measured Noise Levels, dB			
		$L_{Aeq,T}$	L_{AFMax}^1	$L_{A90,T}$	$L_{A10,T}$
Monday 15/04/2024	12:00 – 23:00	65	106	52	66
	23:00 – 07:00	59	93	45	59
Tuesday 16/04/2024	07:00 – 23:00	67	102	53	68
	23:00 – 07:00	59	83	44	60
Wednesday 17/04/2024	07:00 – 23:00	66	106	52	66
	23:00 – 07:00	58	80	44	60
Thursday 18/04/2024	07:00 – 23:00	66	102	51	66
	23:00 – 07:00	60	97	45	60
Friday 19/04/2024	07:00 – 23:00	66	107	51	66
	23:00 – 07:00	57	81	42	59
Saturday 20/04/2024	07:00 – 23:00	64	100	48	66
	23:00 – 07:00	57	82	41	60
Sunday 21/04/2024	07:00 – 23:00	63	101	47	65
	23:00 – 07:00	58	86	42	58
Monday 22/04/2024	07:00 – 11:15	69	104	51	66
Resultant Noise Level²	Daytime	66	107	51	66
	Night-time	58	97	43	59

¹ Highest individual L_{AFmax} measured throughout the time period.
² Resultant $L_{Aeq,T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples, and the $L_{A10,T}$ and $L_{A90,T}$ are the arithmetic average of $L_{A10,15min}$ and $L_{A90,15min}$ samples respectively. $L_{AFmax,15min}$ is the highest sample within the period. All values are rounded to the nearest whole number.

Table 5 Measured noise levels at MP1 (adjacent to Field Heath Road)



Date	Time Period, T	MP2 – Measured Noise Levels, dB			
		$L_{Aeq,T}$	L_{AFMax}^1	$L_{A90,T}$	$L_{A10,T}$
Wednesday 11/02/2026	12:30 – 23:00	63	100	51	66
	23:00 – 07:00	58	87	46	57
Thursday 12/02/2026	07:00 – 23:00	66	104	52	68
	23:00 – 07:00	59	81	46	57
Friday 13/02/2026	07:00 – 23:00	65	101	51	68
	23:00 – 07:00	55	80	42	55
Saturday 14/02/2026	07:00 – 23:00	61	97	46	65
	23:00 – 07:00	55	79	43	55
Sunday 15/02/2026	07:00 – 23:00	62	86	50	65
	23:00 – 07:00	58	84	46	56
Monday 16/02/2026	07:00 – 23:00	65	98	51	68
	23:00 – 07:00	59	81	44	57
Tuesday 17/02/2026	07:00 – 23:00	66	95	51	70
Resultant Noise Level²	Daytime	64	104	50	67
	Night-time	57	87	45	56

¹ Highest individual L_{AFmax} measured throughout the time period.
² Resultant $L_{Aeq,T}$ values are the logarithmic average of $L_{Aeq,15min}$ samples, and the $L_{A10,T}$ and $L_{A90,T}$ are the arithmetic average of $L_{A10,15min}$ and $L_{A90,15min}$ samples respectively. $L_{AFmax,15min}$ is the highest sample within the period. All values are rounded to the nearest whole number.

Table 6 Measured noise levels at MP2 (adjacent to Royal Lane)

An averaged daytime noise level of 66 dB $L_{Aeq,16hour}$ was measured at location MP1, with a night-time noise level of 58 dB $L_{Aeq,8hour}$.

Noise levels measured at location MP2 were 64 dB $L_{Aeq,16hour}$ for the daytime period and 57 $L_{Aeq,8hour}$ for the night time period.

5.2 Representative Background Sound Levels

The proposed building services plant equipment will operate on a 24/7 basis. As such, all time periods shall be assessed. Section 8.1.3 and 8.1.4 of BS 4142:2014+A1:2019 state the following:

“... the background sound level used for the assessment should be representative of the period being assessed...”

“This level should account for a range of background sound levels and should not automatically be assumed to be either the minimum or modal value.”

Table 7 below details representative background sound levels at MP1 which have been established from the histograms in Appendix D for daytime and night-time periods following the guidance of BS 4142:2014+A1:2019.



Measurement Position	Representative Background Sound Level (dB)	
	Day Hours $L_{A90,1\text{hour}}$ (07:00-23:00)	Night Hours $L_{A90,15\text{mins}}$ (23:00-07:00)
MP1	49	41

Table 7 Measured representative background sound levels

5.3 Adopted Plant Noise Limits

Based on the criteria established in Section 2 of this document and the background sound levels summarised above, the noise limits set out below in Table 8 are to apply at 1 m from the nearby off-site residential windows or 1.2 m above any adjacent residential garden, terrace, balcony or patio,

Receptor	Description	Plant Noise Emission Limits $L_{Ar,Tr}$ (dB)	
		Day Hours (07:00-23:00)	Night Hours (23:00-07:00)
NSR1	Pield Heath Rd Residences	44	36

Table 8 Plant noise emission limits at the nearest off-site noise sensitive windows

As detailed within Table 2, the limits for internal noise within wards is NR30. However, it should be recognised that this level is from all plant noise contributions (alongside existing external and internal plant noise contributions). As such, internal on-site plant noise contributions for plant proposed in this scheme will be assessed against NR25 internally within on-site noise sensitive spaces. This is to ensure that internal noise levels arising from cumulative plant noise emissions are likely to remain at the level specified in Table 2, as derived from HTM 08-01. This is not a planning requirement, but is provided for completeness.

Receptor	Description	Plant Noise Emission Limits (Internal Noise Break-in) (dB) Hz							
		63	125	250	500	1k	2k	4k	8k
NSR2	Nearest on-site noise sensitive spaces	55	44	35	29	25	22	20	18

Table 9 Plant noise emission limits within the nearest on-site noise sensitive spaces



6 Plant Noise Assessment

6.1 Proposed Installation

The following items of plant within Table 10 are proposed for installation. A sound power spectra has been stated from the manufacturer's data sheet. A single figure sound power level has been applied based on our own calculations.

Unit Description	Sound power octave band centre frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Extract Fan	75	87	79	80	77	78	72	70	84
Supply Fan	78	90	82	83	80	81	75	73	87
Cumulative Sound Power	80	92	84	85	82	83	77	75	88

Table 10 Plant unit noise levels, dBA L_w

6.2 Methodology

The assessment has taken into account radiation and distance losses, directivity, and façade reflections, where each is appropriate. The assessment has been undertaken on the basis of all plant running simultaneously during the appropriate hours where applicable.

6.3 Predictions of Plant Noise Emissions

6.3.1 Results Without Mitigation

An assessment of the proposed operational plant has been undertaken without additional acoustic mitigation. Simple calculations have been made using the following assumptions:

- Simple distance losses have been applied between source and receptor with no screening accounted for from intervening buildings (worst-case). This has been taken as nominally 49 metres to NSR1 Pield Heath Rd as a worst-case simple assessment. It is noted that the distance from other residential receptors is marginally greater and will not require assessment.
- For calculating internal levels within a ward, standard double glazing has been assumed using SRI data for typical 4/12/4 glass configuration.
- Internal levels within a ward estimated based on a simple level difference calculation for glazing elements. The closest / worst-case ward window has been assumed.
- The noise source has been considered to exhibit broadband continuous noise without any distinguishing acoustic characteristics that would warrant a penalty following BS 4142 guidance.
- The following cumulative noise levels (with all equipment running during the day and night periods) are predicted at each respective NSR (plant noise limit in blue) within Table 11 below.



Assessment Period	Octave Band Centre Frequency, Hz								dB(A) or NR/ Criterion
	63	125	250	500	1k	2k	4k	8k	
NSR1 – Pield Heath Rd Residences (contribution at façade)									
Day	41	53	45	46	43	44	38	36	50/44
Night									50/36
NSR2 – Nearby Wards (internal noise contribution)									
Day/Night (Closed Windows)	23	33	29	22	9	8	8	6	NR24/NR25

Table 11 Predicted external plant noise emissions at NSRs with no mitigation

Based on the predicted noise emissions from Table 11 above, the established day and night period criteria have been exceeded at NSR1 during both the daytime and nighttime period as such, further mitigation will be required. As for NSR2 internal noise contribution from the relocated SDEC plant would not exceed internal noise levels.

RSK Acoustics assume that the Same Day Emergency Care Unit at Hillingdon Hospital is mechanically ventilated and windows are sealed for safety, liability and infection control specifically at the NSR2 receiver outlined in Figure 2.

6.3.2 Proposed Mitigation

The following mitigation measures in Table 12 below was provided by the manufacturer with intention to use attenuators for the AHU. This applies to all atmospheric noise-radiating elements, including exhaust discharge, fresh air intake.

Mitigation / Plant Equipment Elements	Proposed Attenuator Insertion Loss in Octave Band Centre Frequency, Hz							
	63	125	250	500	1k	2k	4k	8k
ATT-003 – AHU/01 FAI Rectangular SG01V/3C/L/SM	10	17	25	30	27	19	18	14
ATT-004 – AHU/01 EXH Atmosphere side, Rectangular SG01V/3C/L/S	11	19	30	36	27	21	20	14

Table 12 Proposed Attenuators insertion loss

The manufacturer's data does not include for case radiated breakout data. It is expected that if sound power breakout from AHU casing does not exceed LwA 67dB that noise emission via the casing will be compliant. Clarification on the breakout sound power from the AHU casing should be sought.

6.3.3 Results with Mitigation

With the recommended acoustic mitigation in Table 12 applied, the following cumulative noise emissions from the proposed SDEC plant relocation have been calculated to the nearest NSRs outlined in Table 3 (plant noise limits in blue).



Assessment Period	Octave Band Centre Frequency, Hz								dB(A) or NR/ Criterion
	63	125	250	500	1k	2k	4k	8k	
NSR1 – Pield Heath Rd Residences (contribution at façade)									
Day	28	33	16	12	13	22	17	19	28/44
Night									28/36
NSR2 – Nearby Wards (internal noise contribution)									
Day/Night (Closed Windows)	19	22	9	-3	-12	-5	-4	-2	NR7/NR25

Table 13 Predicted external plant noise emissions at NSRs with attenuators



7 Conclusions

An environmental sound survey has been carried out at Hillingdon Hospital to establish the representative background noise levels used for assessment.

Noise emissions from the proposed relocation of the SDEC Plant has been predicted at the assessment locations based on manufactures plant data and using simple calculations tending towards a worst case scenario.

Assessment criteria for noise emission limits at off site (residential) receptors has been established. Internal limits for on-site receptors (wards overlooking the plant installation) have been established following HTM- 08-1 noise rating levels for healthcare buildings.

It has been demonstrated that the predicted noise levels will not exceed the established plant noise limits at the nearest residential receptors during the day or night time periods with the proposed mitigation by attenuators to be incorporated.



Appendix A – National Policy and Guidance

National Planning Policy Framework (NPPF): 2024

The National Planning Policy Framework (NPPF) (published March 2012 & updated February 2021) is the means by which noise is considered within the planning regime. The NPPF does not contain assessment design target, instead providing a series of policies, giving local authorities the flexibility in meeting the needs of local communities. The NPPF states:

“Planning policies and decisions should contribute to and enhance the natural and local environment by [...] 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.”

“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 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.”

“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.”

Noise Policy Statement for England (NPSE): 2010

Environment, Food and Rural Affairs (Defra) and sets out the approach to noise within the Government’s sustainable development strategy.

The significance of impacts from noise are defined within the NPSE as follows:

“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.

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

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

The three aims of the NPSE are to:



"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.

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.

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."

Planning Practice Guidance (PPG)

The Department for Communities and Local Government 'Planning Practice Guidance' (PPG) expands upon the NPPF and NPSE. The guidance does not include any specific noise levels but sets out further principles that should underpin a noise assessment. The PPG states:

"Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

whether or not a significant adverse effect is occurring or likely to occur;

whether or not an adverse effect is occurring or likely to occur; and

whether or not a good standard of amenity can be achieved."

It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to SOAEL, LOAEL and NOEL and presents a table, reproduced below. The implication of the final line of the table is that only the 'noticeable and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

Response	Examples of outcomes	Increasing effect level	Action
NOAEL (No Observed Effect Level)			
Not present	No effect	No observed effect	No specific measures required
NOAEL (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
LOAEL (Lowest Observable 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



Response	Examples of outcomes	Increasing effect level	Action
SOAEL (<i>Significant Observed Adverse Effect Level</i>)			
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

Table A-1 PPG Examples of Outcomes



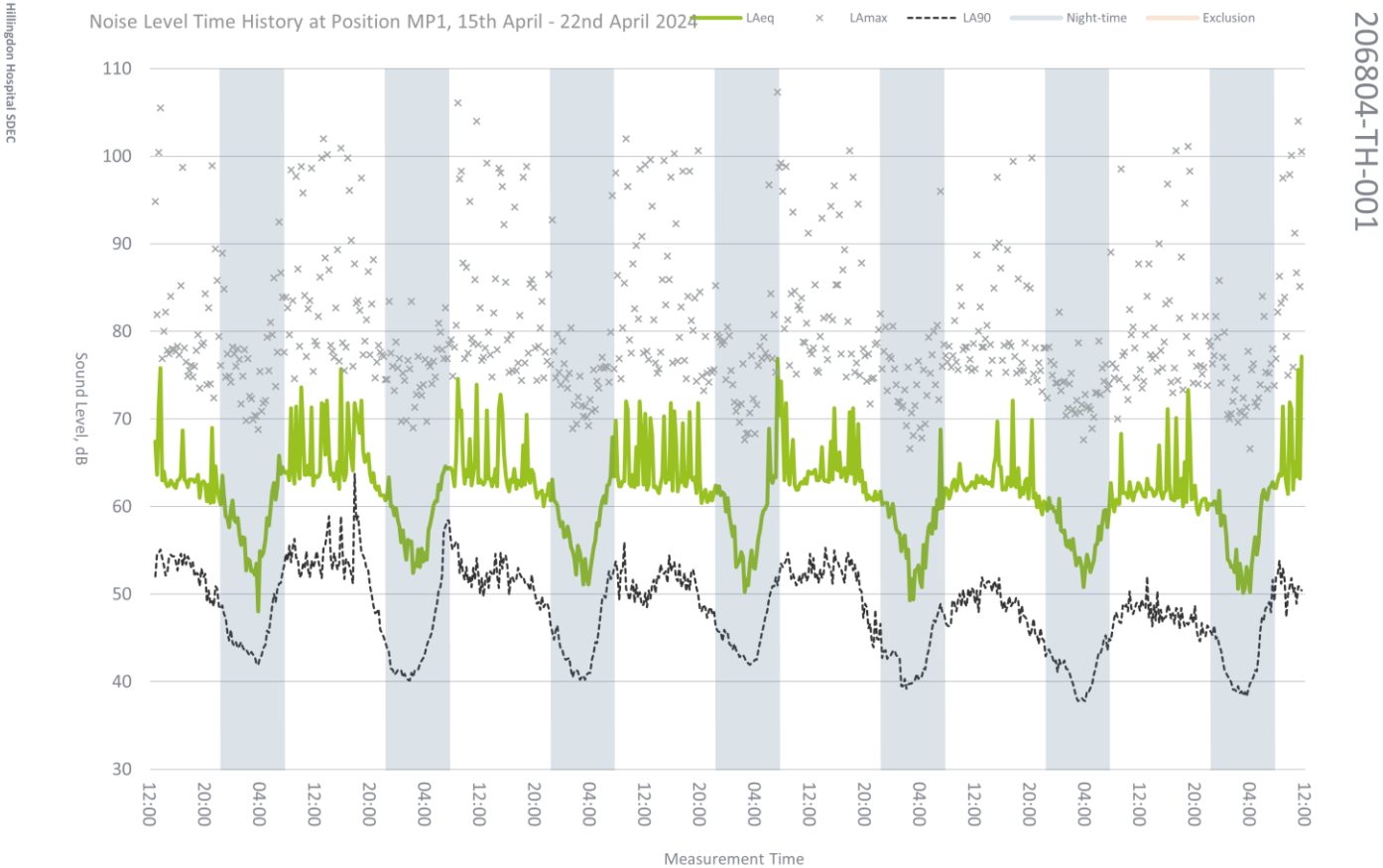
Appendix B – Site Installation Pictures

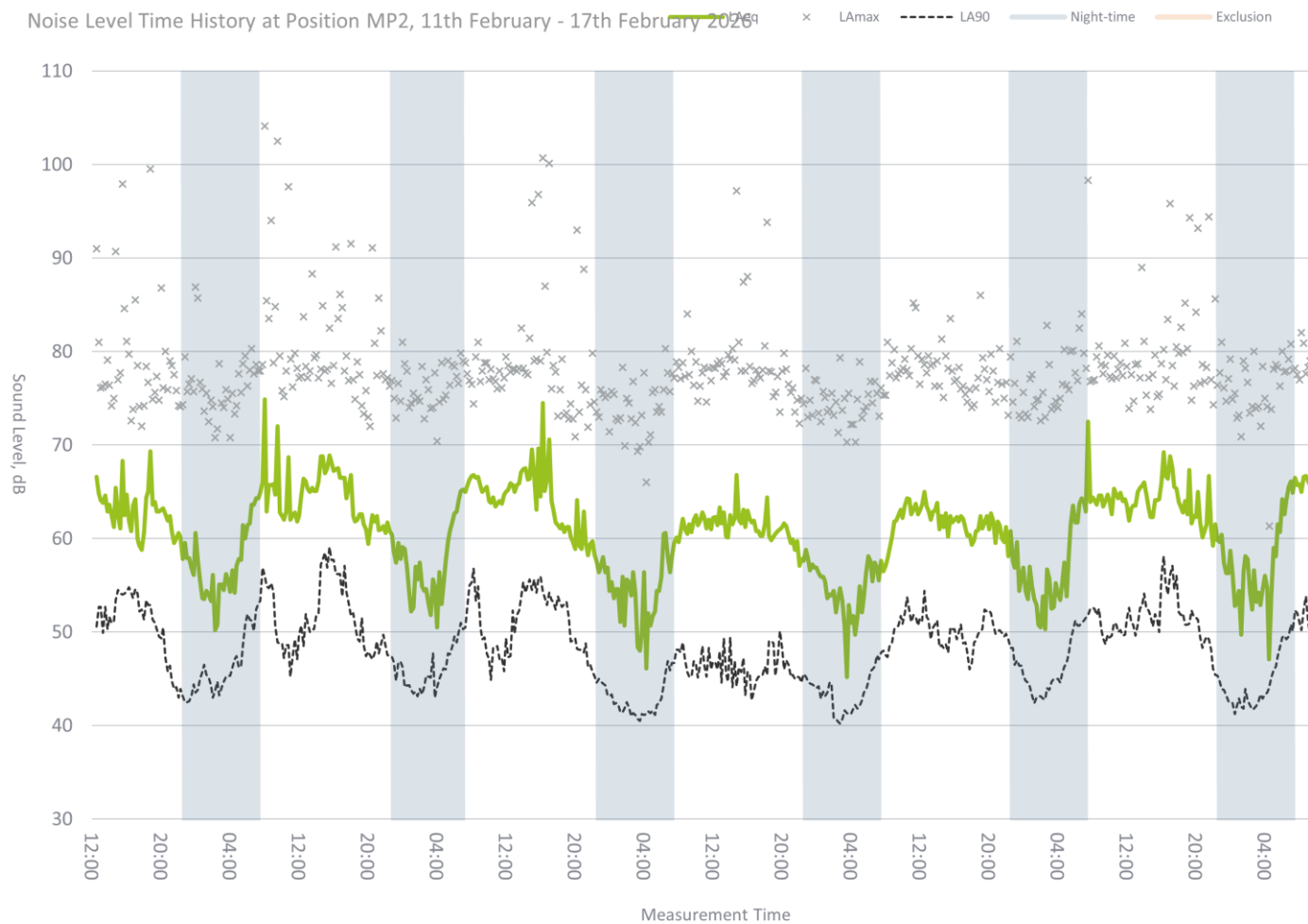






Appendix C – Time History



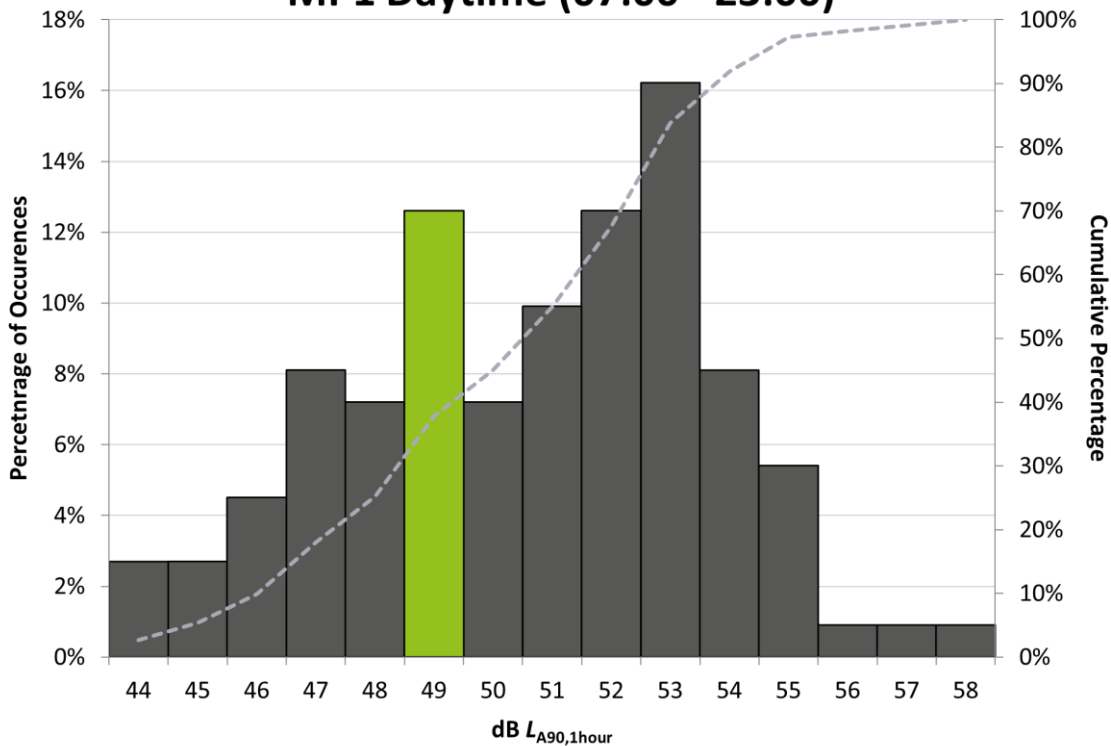


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Appendix D – Background Sound Histograms

MP1 Daytime (07:00 - 23:00)



MP1 Night-time (23:00 - 07:00)

