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NMGH Multistorey Car Park
Crumpsall, Manchester

Verification Environmental Noise Impact Assessment (Planning Condition 17)

20200-SOL-NM110-ZZ-RP-Z-0003 P01
21 August 2023

PROJECT:	NMGH Multistorey Car Park Manchester Verification Environmental Noise Impact Assessment (Planning Condition 17)
CLIENT:	Morgan Sindall Construction & Infrastructure Ltd 6th Floor, Anchorage 2 Manchester M50 3YW
DOCUMENT REFERENCE:	20200-SOL-NM110-ZZ-RP-Z-0003 P01
SIGNED:	BRIAN HORNER
CHECKED:	SIMON FERENCZI
DATE:	21 August 2023

NMGH MULTISTOREY CAR PARK

VERIFICATION ENVIRONMENTAL NOISE IMPACT ASSESSMENT (PLANNING CONDITION 17)

20200-SOL-NM110-ZZ-RP-Z-0003 P01

SUMMARY

Sol Acoustics Ltd (”Sol”) has been appointed to provide a verification environmental noise impact assessment for the new multistorey car park, which is sited at the North Manchester General Hospital, as located off Delaunays Road in Crumpsall, Manchester, M8 5RP (the “Facility”). The purpose of this report is to assess the compliance of the as built Facility with the requirements of Planning Condition 17 of the December 2020 Planning Consent (Planning Application number: 128905/FO/2020).

This acoustic assessment is based upon the results of an environmental noise survey as previously conducted by Sol between c.11:15 hours during Wednesday 16 June and c.11:00 hours during Thursday 17 June 2021 and also by RSK in September 2020. Based upon the findings of the previous environmental noise surveys, maximum environmental noise level limits have been specified for all externally sited building services plant and equipment in accordance with the requirements of Planning Condition 17.

This report has been updated following on-site acoustic commissioning noise level measurements as undertaken by Sol during 16 August 2023 of the as-installed externally sited mechanical services equipment (comprising external mechanical ventilation louvres and DX units).

It is the findings of this assessment that the combined noise Rating Level as due to all externally sited mechanical services plant as associated with the as-built Facility meets the requirements of Planning Condition 17.

Please refer to the main report and appendices for further information.

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1 INTRODUCTION

Sol Acoustics Ltd ("Sol") has been commissioned by Morgan Sindall Construction & Infrastructure Ltd ("MS") to provide a verification environmental noise impact assessment for the new multistorey car park, which is sited at the North Manchester General Hospital, as located off Delaunays Road in Crumpsall, Manchester, M8 5RP (the "Facility").

The purpose of this report is to assess compliance of the as built Facility with the requirements of Planning Condition 17 of the Planning Consent for the Facility (Planning Application number: 128905/FO/2020).

This report provides the following information:

- Determine the prevailing, pre-existing daytime and night time Background Sound Level climate at the receptors through direct, environmental noise measurement and pertinent noise sensitive receptors ("NSRs").
- Identify all existing and significant discrete plant noise sources located at the Facility.
- Obtain, through direct noise level measurement, noise level data for all acoustically significant externally sited mechanical services plant associated with the Facility.
- Calculate the resultant environmental noise level contribution and impact at the receptors, as during daytime and night time periods, and taking factors such as distance to receptors, acoustic screening effects and other environmental features into account.
- Assess compliance with the requirements of Planning Condition 17.

This acoustic report is structured as follows:

- Section 2 provides a basic description of the Facility and surrounding NSRs.
- Section 3 provides a summary of the requirements of Planning Condition 17 and BS 4142:2014+A1:2019.
- Section 4 provides summary details of the benchmark environmental noise survey as previously undertaken in order to determine the pre-existing environmental noise climate at the identified NSRs.
- Section 5 provides a description of the as installed plant and a summary of the plant noise level measurements undertaken.
- Section 6 provides a summary of the proprietary 3D acoustic models constructed and acoustic calculations undertaken.
- Section 7 assesses compliance with the requirements of Planning Condition 17.
- *Appendix A provides a glossary of acoustic terminology.*
- *Appendix B provides details of the noise surveys undertaken and a summary of the data obtained from these.*
- *Appendix C provides the results of the on-site plant noise level measurements.*
- *Appendix D gives details and qualifications of contributing Sol Acoustics' staff.*

2 DESCRIPTION OF SITE

2.1 General Overview of the Site and Surroundings

The Facility is to be sited within the wider North Manchester General Hospital, as located off Delaunays Road in Crumpsall, Manchester, M8 5RB. Currently on the development site is the Limbert Education Centre. However, this building is proposed to be demolished as part of the wider redevelopment of the hospital.

The nearest pre-existing NSR are the hospital buildings which are as located c.15 metres distance to south of the Facility.

The nearest *residential* dwellings to the Facility are as follows:

- Housing on Delaunay Road, located c.250 metres distance to the north west of the Facility
- Housing on Birch Road, c.320 metres distance to the west
- Housing on Magna Drive, c.400 metres distance to the south
- Housing on Longshaw Close, c.320 metres distance to the south
- Housing on Wallbrook Drive, c.260 metres distance to the east

An aerial photograph of the Facility in relation to the nearest identified noise sensitive premises is shown in Figure 1.

2.2 Development Proposals

A new build six-storey car park has been constructed on site. The car park provides ground floor cycle storage, changing facilities, WCs and shower facilities, and the Parking Manager's Office.

The site plan is presented in Figure 2. The proposed ground floor site plan is shown in Figure 3.



Figure 1: Aerial photograph of the site and the surroundings (Google 2022)

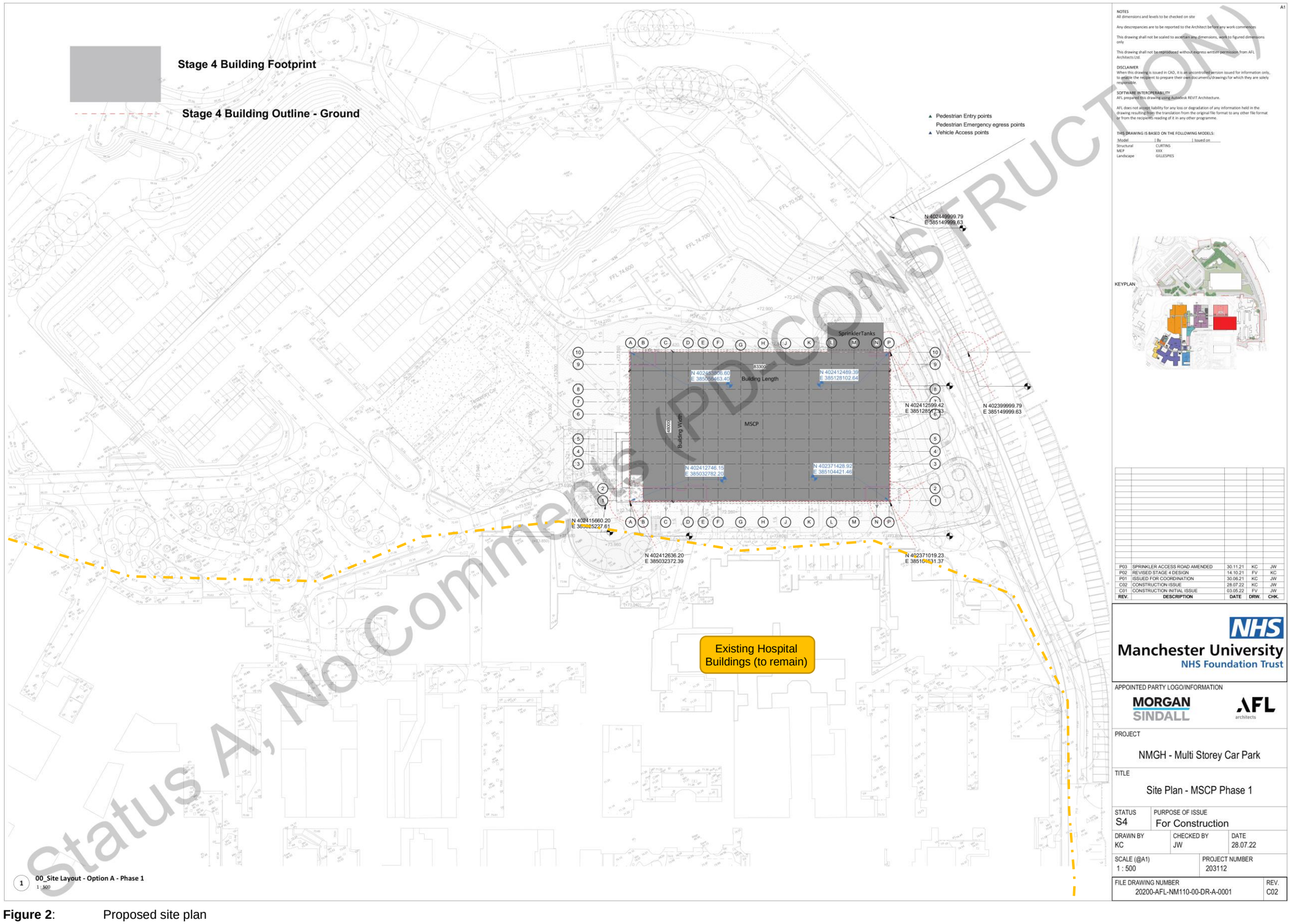
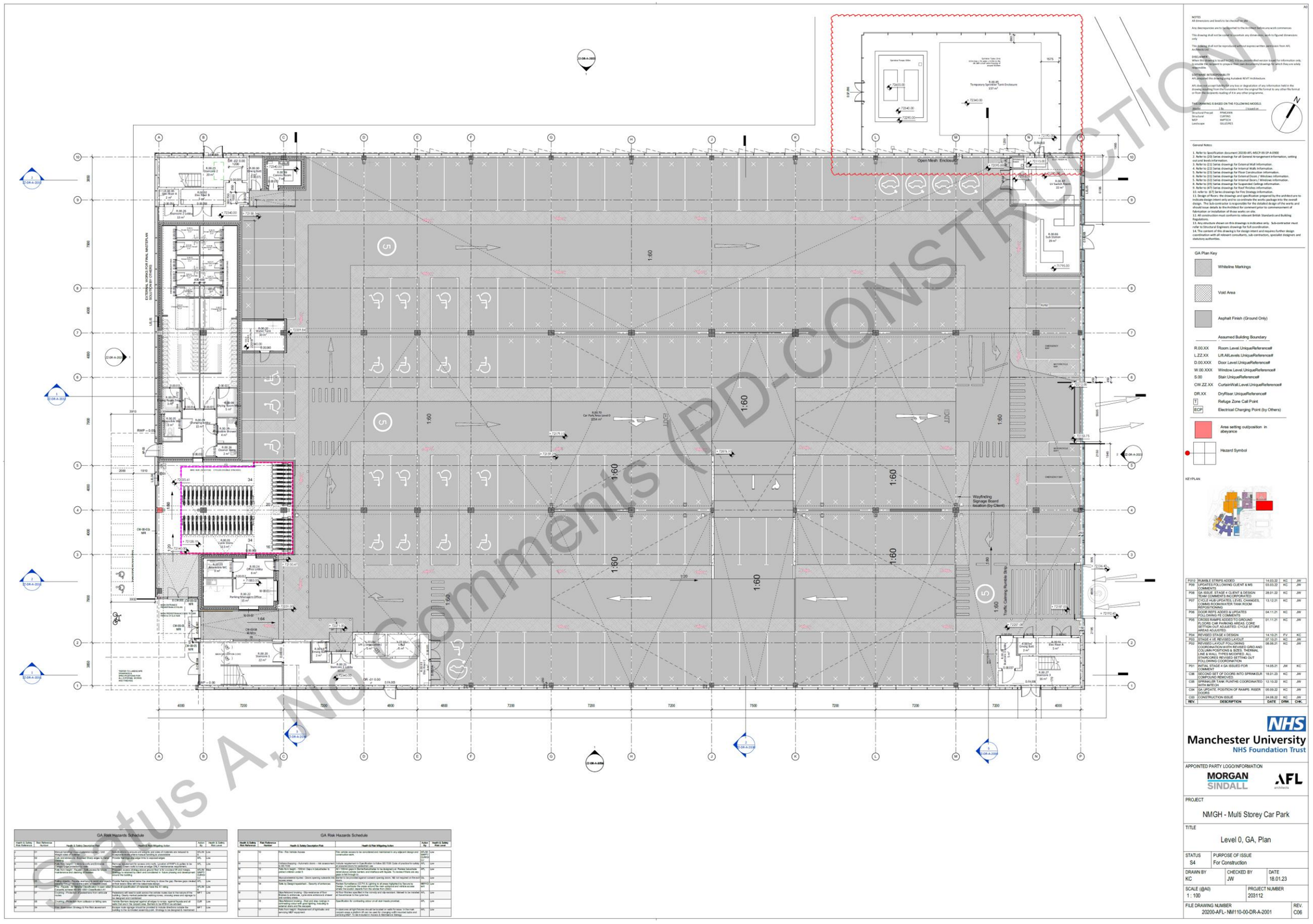


Figure 2: Proposed site plan



Status A - No Comments (PD-CONSTRUCTION)

Figure 3: Proposed ground floor plan

3 ENVIRONMENTAL NOISE PERFORMANCE SPECIFICATION REQUIREMENTS

3.1 Environmental Noise Egress from the Facility

Planning permission for the Facility was granted by Manchester City Council ("MCC") on 16 December 2020 (Planning Application number: 128905/FO/2020). Condition 17 relates to noise and states the following:

> '… *17) Notwithstanding the noise impact assessment stamped as received by the City Council, as Local Planning Authority, on the 16 December 2020, (a) Prior to the first use of the MSCP and cycle hub hereby approved, details of any externally mounted ancillary plant, equipment and servicing shall be submitted for approval in writing by the City Council, as Local Planning Authority. For the avoidance of doubt, externally mounted 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 (L_{A90}) level at the nearest noise sensitive location.*
>
> *(b) Prior to the first use of MSCP and cycle hub, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ.*
>
> *Reason - To minimise the impact of plant pursuant to policies SP1 and DM1 of the Manchester Core Strategy (2012) and saved policy DC26 of the Unitary Development Plan for the City of Manchester (1995)* …'

Planning Condition 17 refers to the noise impact assessment report as issued by RSK, as dated 11 December 2020 (document reference: 298207-RSK-RP-002-(02)). Summary details and results from the RSK environmental noise survey are summarised and provided in Section 4.2 of this report.

During 15 September 2022, Planning Condition 17a was successfully discharged by MCC (Application number: CDN/22/0525). The following comments were issued by MCC in relation to Planning Condition 17:

> *'… The following information has been submitted in respect of this planning condition:*
>
> - *Sol Acoustics (doc ref. 20200-SOL-NM110-ZZ-RP-Z-0002) stamped as received by the City Council, as Local Planning Authority, 2 August 2022.*
>
> *The above information has been considered and is acceptable in order to discharge part (a) of this planning condition.*
>
> *In order to discharge this planning condition in full, part (b) of this planning condition requires that prior to the first use of MSCP and cycle hub, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met.*
>
> *In instances of non conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ* …'

In summary, in order to fully discharge the requirements of Planning Condition 17, a verification environmental noise impact assessment is required to be undertaken to demonstrate that the as built Facility complies with the requirements of the Planning Condition.

3.2 BS 4142: 2014+A1: 2019

British Standard BS4142: 2014+A1: 2019: '*Method for rating and assessing industrial and commercial sound'* (BS4142) is intended to be used to assess environmental noise of an industrial nature, which includes sound from fixed installations, which comprise mechanical and electrical plant and equipment.

The procedure contained in BS 4142: 2014+A1:2019 for assessing the impact is to compare the measured or predicted noise level from the source in question, the "Specific Sound Level" immediately outside the noise sensitive premises, with the "Background Sound Level". Where the noise contains attention attracting characteristics (i.e. acoustic features) such as tonal, impulsive, intermittent elements, it may be appropriate to apply a correction to the Specific Sound Level to obtain the "Rating Level."

BS4142 states that the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level and the context in which the sound occurs:

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending on the context.

For the daytime, the assessment is carried out over a one-hour period, and over a 15-minute period at night. The daytime and night time periods are typically defined as occurring between 07:00 hours to 23:00 hours, and 23:00 hours to 07:00 hours, respectively.

4 ENVIRONMENTAL NOISE SURVEY

4.1 Environmental Noise Survey – Sol Acoustics

An environmental noise survey has previously been conducted by Sol between c.11:15 hours during Wednesday 16 June and c.11:00 hours during Thursday 17 June 2021. Full details of the survey are presented in Sol report: 20200-SOL-NM110-ZZ-RP-Z-0002 (dated 24 June 2022), which was submitted in support of the original Planning Application for the Facility. The environmental noise survey consisted of a single environmental noise measurement position, as follows:

- **Noise Monitoring Position 1**: Mast-mounted microphone and weather station sited at c.3 metres above local ground level, c.30 metres distance to the north of the existing hospital buildings (which are to remain). The noise climate at this position was dominated by noise from the adjacent car park and noise from distant, existing mechanical plant associated with the existing hospital buildings (which is to remain).

Table 1 provides a basic summary of the free field environmental noise levels measured at Measurement Position 1:

Date	Daytime (07:00 Hours – 23:00 Hours)			Night Time (23:00 Hours – 07:00 Hours)		
	dB L_{Amax}	dB $L_{Aeq,15min}$	dB $L_{A90,15min}$	dB L_{Amax}	dB $L_{Aeq,15min}$	dB $L_{A90,15min}$
16 June 2021	49 – 83	45 – 61	43 – 44	46 – 63	44 – 49	43 – 45
17 June 2022	60 – 86	47 – 68	43 - 47	-	-	-

Table 1: Summary of typical, measured environmental noise levels, broadband terms

Appendix B provides further information and a full summary of the measurement data.

4.2 Environmental Noise Survey – RSK

An environmental noise survey has also previously been conducted by RSK in between Friday 25 September and Wednesday 30 September 2020. Full details of the RSK survey are provided within their noise impact assessment report dated 11 December 2020 (document reference: 298207-RSK-RP-002-(02)). The approximate locations of the noise measurement positions as adopted by RSK are shown in Figure 1.

Table 2 provides a summary of the representative background sound levels of the RSK environmental noise survey (as per Table 4.5 of the RSK report):

Measurement Location	Representative Background Sound Level, dB $L_{Af90,15mins}$		
	Commercial Daytime (07:00 Hours – 19:00 Hours)	Evening (19:00 Hours – 23:00 Hours)	Night Time (23:00 Hours – 07:00 Hours)
UL1	52	40	36
UL2	43	42	41
UL3	39	34	30
UL4	44	41	37

Table 2: Summary of representative background sound levels (as per Table 4.5 of the RSK report)

4.3 Environmental Plant Noise Limits

Planning Condition 17 states that: '… *externally mounted 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 ($L_{Aeq,T}$) below the typical background (L_{A90}) level at the nearest noise sensitive location* …'

Accordingly, Table 3 sets out the maximum permissible Rating Level limits which shall be applicable to Facility at each of the identified NSR:

Location	**Representative Noise Measurement Position**	**Maximum Permissible Rating Level Limit Imposed by Condition 17, dB $L_{Ar,Tr}$**	
		Daytime (07:00 – 23:00)	**Night time (23:00hrs to 07:00hrs)**
Existing hospital buildings, to remain (south of the Facility)	(Sol) Measurement Position 1	38	38
Housing on Delaunay Road (north west of the Facility)	RSK UL1	35	31
Housing on Birch Road (west of the Facility)	RSK UL4	36	32
Housing on Magna Drive (south of the Facility)	RSK UL3	29	25
Housing on Longshaw Close (south east of the Facility)	RSK UL3	29	25
Housing on Wallbrook Drive (east of the Facility)	RSK UL2	37	36

Table 3: Environmental noise limits for building services plant

It must be noted that the M&E plant noise limits identified above are applicable to all plant serving the scheme, when operating simultaneously. The allowable individual noise contribution from all plant items and atmospheric terminations such as louvres and cowls must be determined based on these overall noise limits – and consequently will be lower.

All noise limits are expressed in BS 4142: 2014+A1:2019 "Rating Level" terms and consequently must incorporate any and all applicable "penalties" for acoustic features such as acoustic tonality, intermittency and/or impulsivity, all as defined within the Standard.

5 AS INSTALLED BUILDING SERVICES EQUIPMENT

This assessment is based upon information as received from the M&E Engineer: Imtech Engineering Services North Ltd ("Imtech") and the following mechanical services drawing:

- 20200-IES-MSCP-00-DR-M-5001 C03: Mechanical Services heating and ventilation ground floor layout, dated 27 July 2023. This drawing is reproduced in Figure 4 of this report.

The following externally sited plant has been installed:

- OUD/02: Comms Room DX, model: RAV-RM561KRTP-E (0.320m(l) – 1.050m(w) – 0.250m(h))

The following façade mounted mechanical ventilation louvres have been installed:

- EF/01: Cycle Store extract fan outlet, model: Elta Fans axial wall fan AX23/9ARB
- EF/02: Accessible WC extract fan outlet, model: Elta Fans centrifugal box SLP125EC
- MVHR/01: Changing Room MVHR inlet, model: Topvex TC25-R-EL12-B
- MVHR/01: Changing Room MVHR outlet, model: Topvex TC25-R-EL12-B
- MVHR/02: Parking Managers Office intake/outlet, model HR200Wk

The location of the above building services plant is highlighted in Figure 4.

5.1 Individual Plant Noise Measurements (16 August 2023)

Sol attended the Facility during Wednesday 16 August 2023 in order to carry out close-quarters noise measurements of all externally-sited mechanical services equipment. MS have advised that all plant was confirmed by the Site Operative to be operating at maximum design duty and speeds.

All noise measurements were carried out using Type 1 Precision Grade noise monitoring equipment. The complete measuring systems were field calibrated immediately prior to and following the noise survey period. (Full details of the noise monitoring systems are retained on file by Sol, including traceable calibration records; these are available for review if needed).

The noise survey comprised of full broadband A-weighted, $L_{Aeq,T}$, and one-third octave unweighted, $L_{eq,T}$, sound pressure level measurements. All measurements were conducted over 10-second sample periods, as using an omnidirectional microphone, at a measurement distance of 1 metre from each plant item. In all cases, two measurements were conducted at each position in order to demonstrate repeatability of the results.

The weather conditions remained favourable for the duration of the survey. The microphone systems were entirely weatherproofed and fitted with an all-weather environmental windshield.

The results of all individual plant noise measurements are summarised in Appendix B of this report.

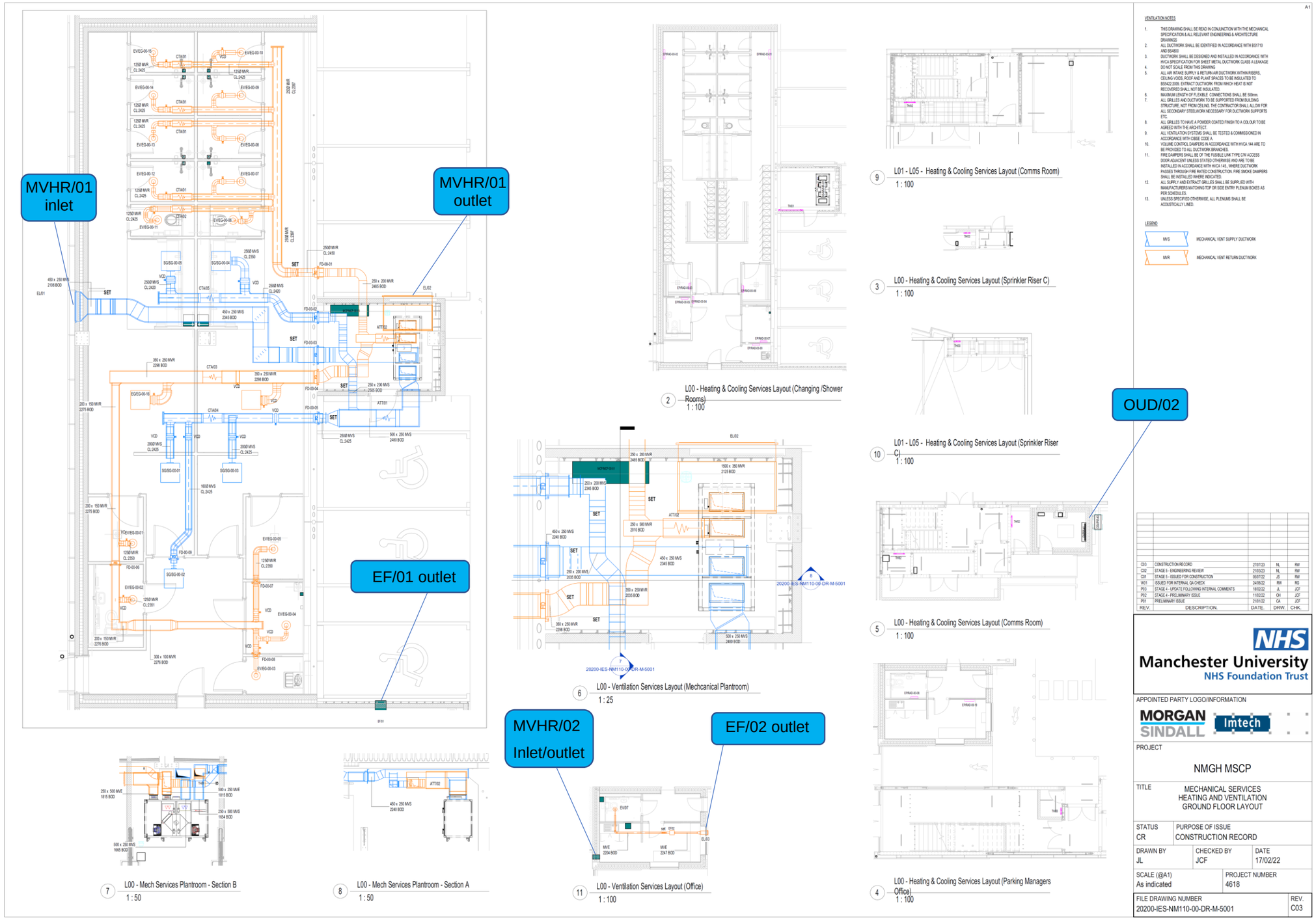


Figure 4: Building services mechanical ductwork layout drawing (annotated)

6 ENVIRONMENTAL NOISE MODEL

6.1 Methodology and Basis of 3D Environmental Noise Models

In order to predict the likely noise levels impinging on the surrounding noise sensitive receptors, proprietary 3D computer noise models were created using the DataKustik "CadnaA" noise mapping software. The following assumptions have been made when generating the noise model:

(a) The noise model was set up to apply the noise prediction methodology set out in ISO 9613-2: '*Acoustics – Attenuation of Sound propagation outdoors – Part 2: General Method of Calculation'*.

(b) The model was set to include third order reflected noise from solid structures.

(c) Ground absorption, as defined in ISO 9613-2, has been taken into consideration. The base ground absorption for the model has been set to G=0.0 (hard ground).

(d) The noise impact as expected at the surrounding residential receptors has been modelled at a height of 4 metres above local ground level.

(e) All externally sited plant noise sources have been modelled as point sources

(f) The beneficial acoustic screening afforded by the car park itself has excluded from the noise model.

7 ENVIRONMENTAL NOISE IMPACT ASSESSMENT

Table 4 presents the predicted overall A-weighted, BS4142-defined "Rating Level" at the identified noise sensitive receptor from the Facility at the identified NSR and compares the results to the requirements of Planning Condition 17. The corresponding Specific Sound Level noise contour plot is presented in Figure 5.

The following BS 4142:2014+A1:2019 defined "acoustic character corrections" have been applied to the predicted Specific Sound Levels in order to determine the noise Rating Level:

- Where the predicted Specific Sound Level is less than or equal to 10dB below the pre-existing Background Sound Level, no acoustic character correction has been applied.
- Elsewhere, a +3dB acoustic character correction has been added.

Table 4 shows that the predicted Rating Level at each of the identified NSR meets the requirements of Planning Condition 17.

Noise Sensitive Receptor	Assessment Period	Predicted Specific Level, dB $L_{Aeq,T}$	Acoustic Character Correction, dB	Predicted Rating Level, dB $L_{Ar,Tr}$	Maximum Permissible Rating Level Limit Imposed by Condition 17, dB $L_{Ar,Tr}$	Exceedance, dB	Pass / Fail
Existing hospital buildings, to remain (south of the Facility)	Daytime (07:00hrs - 23:00hrs) T = 1 hour	27	+0	27	38	-11	Pass
	Night Time (23:00hrs – 07:00hrs) T = 15 minutes	27	+0	27	38	-11	Pass
Housing on Delaunay Road (north west of the Facility)	Daytime (07:00hrs - 23:00hrs) T = 1 hour	8	+0	8	35	-27	Pass
	Night Time (23:00hrs – 07:00hrs) T = 15 minutes	8	+0	8	31	-23	Pass
Housing on Birch Road (west of the Facility)	Daytime (07:00hrs - 23:00hrs) T = 1 hour	-2	+0	-2	36	-38	Pass
	Night Time (23:00hrs – 07:00hrs) T = 15 minutes	-2	+0	-2	32	-34	Pass
Housing on Magna Drive (south of the Facility)	Daytime (07:00hrs - 23:00hrs) T = 1 hour	-8	+0	-8	29	-37	Pass
	Night Time (23:00hrs – 07:00hrs) T = 15 minutes	-8	+0	-8	25	-33	Pass
Housing on Longshaw Close (south east of the Facility)	Daytime (07:00hrs - 23:00hrs) T = 1 hour	-3	+0	-3	29	-32	Pass
	Night Time (23:00hrs – 07:00hrs) T = 15 minutes	-3	+0	-3	25	-28	Pass
Housing on Wallbrook Drive (east of the Facility)	Daytime (07:00hrs - 23:00hrs) T = 1 hour	16	+0	16	37	-21	Pass
	Night Time (23:00hrs – 07:00hrs) T = 15 minutes	16	+0	16	36	-20	Pass

Table 4: Planning Condition 17 summary assessment

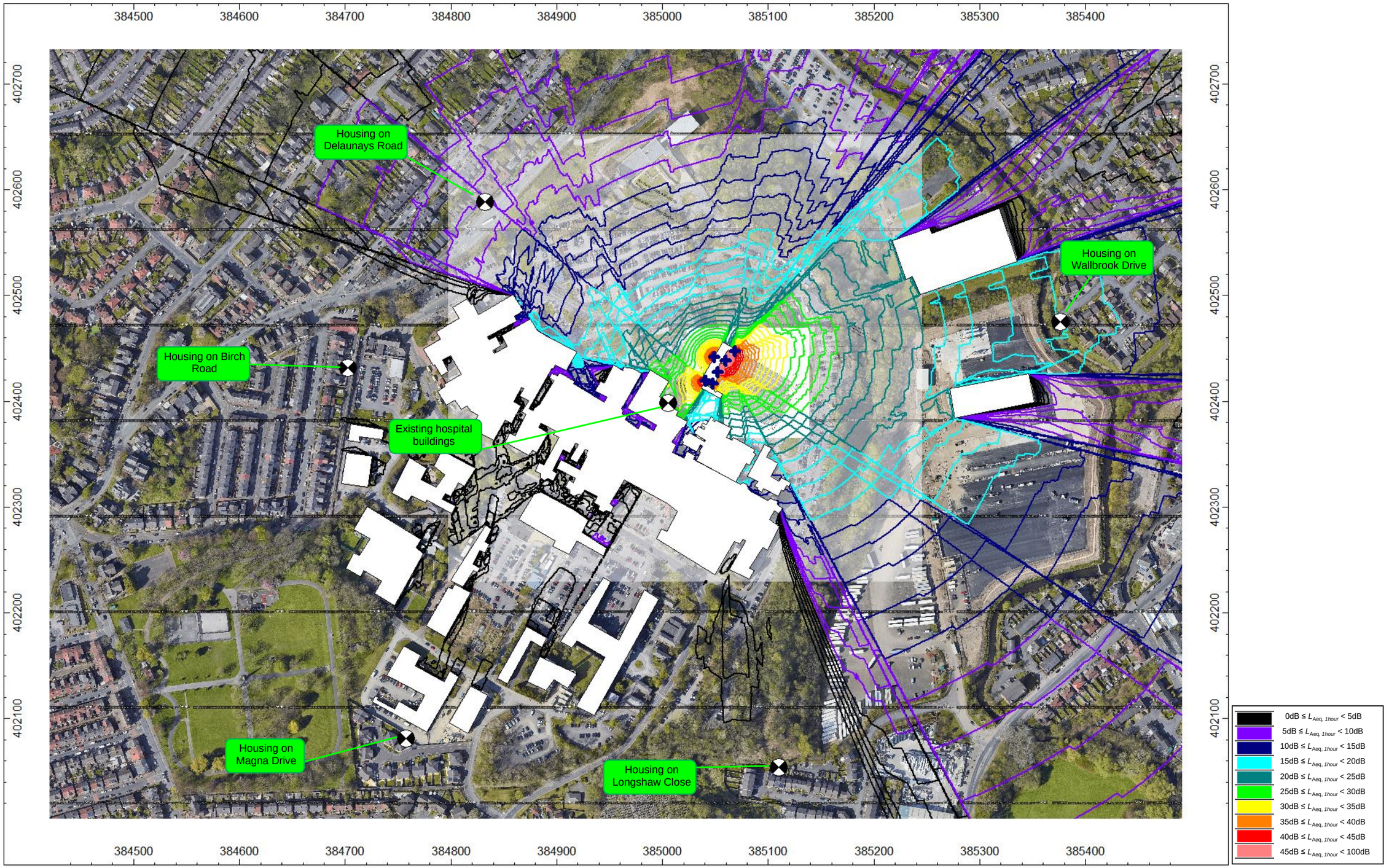


Figure 5: Predicted Specific Sound Level at 4 metre grid height (Google Maps 2023)

APPENDIX A GLOSSARY OF ACOUSTIC TERMS

Term	Abbreviation	Description
Decibel	dB	A scale for comparing the ratios of two quantities, including sound pressure and sound power.
A-weighting	dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the change in sensitivity of the human ear at varying frequencies.
Sound Pressure Level	L_{pA}	A measure of the sound pressure at a particular location. Typically expressed in dB(A) referenced to $2x10^{-5}$ Pascals.
Equivalent Continuous Sound Level	$L_{Aeq,T}$	The steady level of sound over a prescribed period of time which would contain the same total sound energy as the actual fluctuating noise under consideration in the same period of time.
Statistical Sound Levels	L_{A10} and L_{A90}	The level of noise exceeded for a percentage of the time period being sampled, namely 10% or 90% respectively.
Background Sound Level	$L_{A90,T}$	The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time period being sampled.
Maximum Sound Level	L_{Amax}	The maximum sound or noise level determined with instrumentation set to either a fast time weighting, L_{AFmax}, or a slow time weighting, L_{Asmax}, as occurring during the time period being sampled.
Sound Power Level	L_{wA}	A measure of the total sound energy radiated from a source. Like sound pressure levels, this is also expressed in dB(A) terms, but it is referenced to 1×10^{-12} W.
Broadband		Sound sampled over a wide range of frequencies.
Narrow band		Sound sampled over a specific, restricted frequency range. Used to ascertain the amplitude and significant of individual, audible tones, and to assist in identifying particular sources of noise within a complex, multi-source soundscape environment.
Ambient Sound	$L_{eq,T}$	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far.
Specific Sound Level	$L_{eq,T}$	The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given reference time interval, *Tr*
Rating Level	$L_{Ar,Tr}$	The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.).
Residual Noise	$L_{Aeq,T}$	The ambient sound remaining at given position in a given situation, when the specific sound source is suppressed to such an extent that it no longer contributes to the ambient sound.
Sound Reduction Index	*SRI*	The reduction in sound energy when transmitted through a panel or similar planar element, typically used in relation to single octave or one-third octave frequency band values.
Weighted Sound Reduction Index	R_w	The Sound Reduction Index expressed as a single figure, as expressed against a reference curve.
Dynamic Insertion Loss	*DIL*	Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. an attenuator, acoustic enclosure etc.).
Free Field		Noise measuring location that is free from the presence of sound reflecting objects (except the ground), usually taken to mean being at least 3.5 metres distance from reflective surface(s) or greater.

APPENDIX B NOISE SURVEY DETAILS AND SUMMARY RESULTS

LOCATION

North Manchester General Hospital, Crumpsall, Manchester

WEATHER CONDITIONS

Date	Daytime (07:00 hours – 23:00 Hours)				Night Time (23:00 hours – 07:00 hours)			
	Temp, °C	Rain, mm/h	Wind Direction	Average Wind Speed, m/s	Temp, °C	Rain, mm/h	Wind Direction	Average Wind Speed, m/s
16/12/2020	22	0.0	NE	0.9	14	0.0	NE	0.5
17/12/2020	17	0.0	NE	0.6	-	-	-	-

PERSONNEL PRESENT DURING MEASUREMENTS

Brian Horner BSc (Hons) MIOA – Sol Acoustics Ltd

INSTRUMENTATION

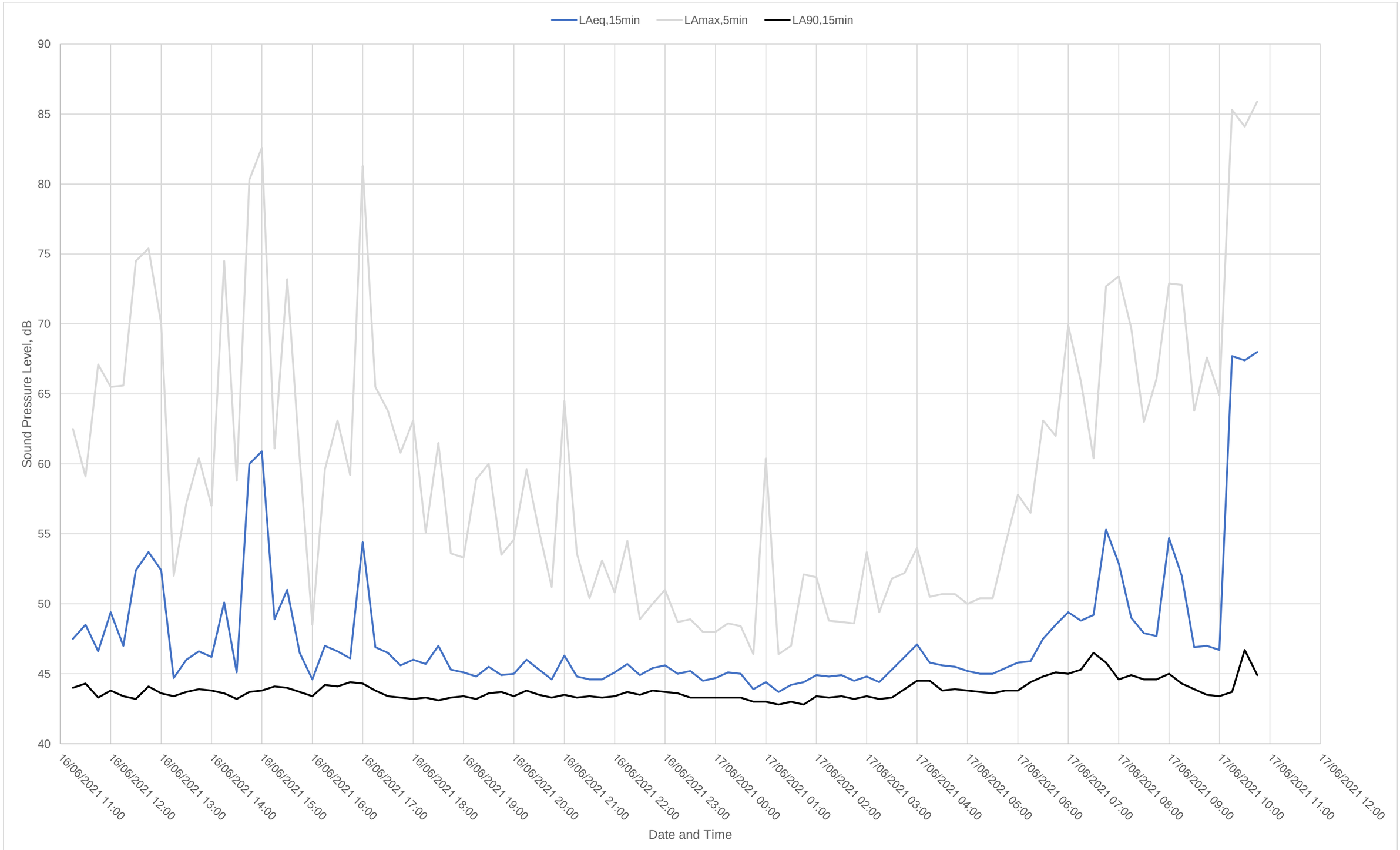
01dB Cube Sound Level Meter (Serial No. 12068)
01dB Pre22 Microphone Preamplifier (Serial No. 1936010)
GRAS 40CD Microphone Capsule (Serial No. 292577)
01dB CAL 21 Acoustic Calibrator (Serial No. 34375244)

METHODOLOGY

Before and after the measurements the sound level meters were checked and calibrated to an accuracy of ±0.3dB using the 01dB CAL 21 Calibrator. The calibrator produces a sound pressure level of 94dB re 2x10-5 Pa @ 1kHz.

MEASUREMENT RESULTS

Graph A1 summarise the results obtained at Measurement Position 1.



Graph A1: Measurement Position 1, 16 to 17 June 2021

APPENDIX C NOISE SOURCE SCHEDULE

Equipment Name	Model	Data Source / Specification	Measurement	Average Sound Pressure Level, dB, at Octave Band Centre Frequency Hz									Average Sound Pressure Level on Measurement Surface, dB L_{pA}	Measurement Distance, m	Measurement Surface area at Measurement Position, m²	Overall Sound Power Level, dB L_{wA}
				31.5	63	125	250	500	1k	2k	4k	8k				
OUD/02: Comms Room DX	RAV-RM561KRTP-E	On-site sound level measurement during 16 August 2023 (SPL@1m)	A	63	60	52	46	47	43	39	36	27	48	1	11	59
			B	63	60	52	45	45	41	39	36	29	47			58
EF/01: Cycle Store extract fan	Elta Fans axial wall fan AX23/9ARB	On-site sound level measurement during 16 August 2023 (SPL@1m)	A	71	71	62	59	53	50	46	42	34	57	1	6	65
			B	71	71	62	59	54	50	46	42	34	57			65
EF/02: Accessible WC extract fan	Elta Fans centrifugal box SLP125EC	On-site sound level measurement during 16 August 2023 (SPL@1m)	A	64	64	54	50	47	45	37	34	26	49	1	6	57
			B	65	64	56	49	47	43	38	35	27	49			57
MVHR/01: Changing Room MVHR supply	Topvex TC25-R-EL12-B	On-site sound level measurement during 16 August 2023 (SPL@1m)	A	64	61	53	50	50	45	41	37	30	51	1	6	59
			B	64	60	53	50	50	46	40	36	27	51			59
MVHR/01: Changing Room MVHR extract	Topvex TC25-R-EL12-B	On-site sound level measurement during 16 August 2023 (SPL@1m)	A	69	81	63	57	53	51	49	43	36	59	1	6	67
			B	70	82	64	57	54	50	51	44	36	59			67
MVHR/02: Parking Managers Office	HR200Wk	On-site sound level measurement during 16 August 2023 (SPL@1m)	A	60	66	63	56	52	50	46	41	33	56	1	6	63
			B	58	66	61	55	49	46	42	36	27	53			61

Table B1: Noise source schedule

APPENDIX D DETAILS AND PROFESSIONAL QUALIFICATIONS OF CONTRIBUTING SOL STAFF

Company Details

Name of Organisation: Sol Acoustics Limited

Status: Private Limited Company

Address: Unit 11, Brunel Court,
Gadbrook Park
CW9 7LP

Telephone Number: 01565 632535

E-Mail: info@solacoustics.co.uk

Nature of Business: Acoustic Consultancy

Directors: Simon Ferenczi

Company Registration Number: 4218702

Key Technical Personnel & Qualifications

Simon Ferenczi	Institute of Acoustics Diploma (with additional modules), MIOA
Brian Horner	BSc (Hons), MIOA

Company Accreditations

Sol Acoustics is a member of The Association of Noise Consultants (ANC) and is qualified to perform sound insulation testing under the ANC's accredited testing scheme to demonstrate compliance with the requirements of Approved Document E of the Building Regulations.