NHS
Hawthorne Consulting Block
Stanley Grove
Manchester
M12 4NH

Vibration Survey

On behalf of

Darwin Group

Project Reference: 94459 | Revision: - | Date: 10th August 2026

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For and on behalf of Noise Solutions Ltd				

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1.0 Introduction

1.1. Noise Solutions Ltd (NSL) has been appointed by Darwin Group to conduct a survey of incident vibration at the proposed temporary NHS Consulting block at Longsight, Manchester.

1.2. The survey is required to determine whether structural vibration complies with the limits set out in HTM08-01.

1.3. To assist with the understanding of this report a glossary of acoustic terms can be found in **Appendix A**. An in-depth glossary of acoustic terms can be viewed online at www.acoustic-glossary.co.uk.

2.0 Context and assessment criteria

2.1. The proposed consulting block will occupy part of the existing ASDA Superstore car park near the northwestern site boundary.

2.2. The facility is predominantly a diagnostic and treatment centre, with consulting rooms, treatment rooms, interview rooms and offices in a single floor.

2.3. The area surrounding the site is both commercial and residential in nature.

2.4. The main sources of vibration affecting the site are passing trains and local traffic.

HTM08-01: Acoustics

2.5. The applicable vibration criteria for various healthcare spaces are given in Sections 2.123 – 2.137 in HTM08-01. As the survey was aimed to measure intermittent vibration from trains, the relevant vibration dose value (VDV) criteria are summarised in Table 1 below.

Table 1 Vibration criteria

Room Type	Criterion, VDV ($m/s^{1.75}$)
Treatment rooms	0.4
Offices, consulting rooms, interview room, reception, staff rest	0.8

2.6. The above values correspond to a low probability of adverse comment for their respective types of accommodations. It is also noted that there is no dose assessment period in HTM08-01. For robustness, we have assumed a more stringent 16-hour dose period for the assessment.

BS 7385-2:1993

2.7. BS 7385-2:1993 *Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration* contains guidance on damage levels from ground-borne vibration. The Standard notes that the probability of damage tends towards zero at 12.5 mm s^{-1} peak component particle velocity

3.0 Vibration survey

3.1. Measurements of groundborne vibration were made between 14.52 and 15.30 hours on Tuesday 21st July 2026. Measurements were made at a position representative of the vibration affecting the proposed development.

3.2. Measurements were made using the equipment listed in Table 2.

Table 2 Vibration survey equipment

Description	Model / serial no.	Calibration date	Calibration certificate no.
Vibration Meter and Triaxial Accelerometer	01dB Orion/10229	11/02/2025	VMT1002000-INS-050

3.3. Calibration certificates for the equipment are included in **Appendix C**.

3.4. The equipment was set to record VDV and peak particle velocity (PPV) in all three orthogonal axes (x, y and z). Measurements were made over five-second intervals, which have then been combined to provide 30-minute values for ease of assessment.

4.0 Vibration assessment

4.1. Incidental vibration values can be used to predict vibration levels inside a building. Guidance is sought from the book titled 'Measurements & Assessment of Groundborne Noise and Vibration' (2nd Edition, 2012), published by the Association of Noise Consultants (ANC).

4.2. Table 14.3 in the guidance details vibration transfer functions from various references and provides single figure attenuation/amplification values for use in vibration assessments. According to the single figure guidance provided by the ANC, the net effect by combining attenuation/amplification effects could in some circumstances result in attenuation of incidental vibration.

4.3. In the context of this site, the net effect on the single storey building could result in, at worst a 0dB increase/decrease of incidental vibration. This is a reasonably worst-case scenario for the proposed building.

4.4. In effect, should the incidental vibration dose value meet the HTM08-01 criteria with the least favourable net effect, the resulting vibration dose values in the building are likely to be lower and thus demonstrating compliance.

4.5. Measured VDV levels were up to 0.0106 $m/s^{1.75}$ with 21 passenger trains passing by. Taking this highest value, and assuming that this level is constant throughout the day, gives worst-case VDV levels for a 16-hour day as shown in Table 3 below.

Table 3 Summary of vibration predictions

Room Type	VDV ($m/s^{1.75}$)	Criterion, VDV ($m/s^{1.75}$)	Pass/Fail
Treatment rooms	0.03	0.4	Pass
Offices, consulting rooms, interview room, reception, staff rest	0.03	0.8	Pass

4.6. The above assessment shows that vibration levels at the site are significantly below the requirements set out in HTM08-01. The probability of adverse comment in these rooms would therefore be low.

4.7. The highest PPV value measured was 0.2976 mm/s. This is significantly below the level at which, according to BS 7385-2:1993, "damage tends towards zero".

5.0 Conclusions

5.1. Noise Solutions Ltd (NSL) has been appointed by Darwin Group to conduct a survey of incident vibration at the proposed temporary NHS Consulting block at Longsight, Manchester.

5.2. A vibration survey was carried out to determine if vibration levels at the above site are below the criteria set out in HTM08-01.

5.3. Survey and assessment results show that the groundborne vibration levels at the site are significantly lower than the criteria for all rooms. The probability of adverse comment would therefore be low.

Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A –weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Summary of measurements

Time	VDV, $m/s^{1.75}$		
	X	Y	Z
14:52	0.000919	0.0005367	0.001472
14:53	0.001231	0.0006306	0.00536
14:54	0.0014	0.0007738	0.006072
14:55	0.001481	0.001491	0.006499
14:56	0.001583	0.001499	0.00663
14:57	0.001654	0.001742	0.006663
14:58	0.001737	0.001754	0.006681
14:59	0.001803	0.001761	0.00672
15:00	0.001851	0.001771	0.007489
15:01	0.00188	0.001776	0.007703
15:02	0.001951	0.001792	0.007713
15:03	0.001998	0.001794	0.007727
15:04	0.002025	0.001796	0.007737
15:05	0.002056	0.001798	0.007746
15:06	0.002106	0.001802	0.00786
15:07	0.002136	0.001804	0.007866
15:08	0.002173	0.001806	0.007896
15:09	0.002196	0.001808	0.007939
15:10	0.002224	0.001812	0.008228
15:11	0.002251	0.001814	0.008714
15:12	0.002291	0.001818	0.008813
15:13	0.002334	0.001826	0.008822
15:14	0.002354	0.001831	0.00965
15:15	0.002379	0.001836	0.009708
15:16	0.002404	0.00184	0.01021
15:17	0.002431	0.001843	0.01031
15:18	0.002471	0.001848	0.01045
15:19	0.002489	0.00185	0.01047
15:20	0.002499	0.001851	0.01048
15:21	0.002519	0.001854	0.01051
15:22	0.002534	0.001856	0.0106
15:23	0.002547	0.001858	0.01064

Time	VDV, $m/s^{1.75}$		
	X	Y	Z
15:24	0.002566	0.00186	0.01064
15:25	0.002578	0.001866	0.01185
15:26	0.002593	0.00187	0.01186
15:27	0.002604	0.001871	0.01229
15:28	0.002614	0.001872	0.01233
15:29	0.002625	0.001875	0.01238

Appendix C Calibration Certificate



CERTIFICAT D'ETALONNAGE
CALIBRATION CERTIFICATE

N° CE-DTE-L-25-PVE-91006

DELIVRE A :
ISSUED FOR : BDP Acoustics

UNITED KINGDOM

INSTRUMENT ETALONNE
CALIBRATED INSTRUMENT

Désignation :
Designation : Vibromètre / *Vibration meter*

Constructeur :
Manufacturer : 01dB

Type :
Type : ORION

N° de serie :
Serial number : 10229

N° d'identification :
Identification number

Date d'émission : 11/02/2025

Ce certificat comprend **6** pages
This certificate includes *pages*

LE RESPONSABLE SAV
AFTER SALE MANAGER
Mounir HAFID

LA REPRODUCTION DE CE CERTIFICAT N'EST AUTORISEE QUE SOUS LA FORME DE FAC-SIMILE PHOTOGRAPHIQUE INTEGRAL

THIS CERTIFICATE MAY NOT BE REPRODUCED OTHER THAN IN FULL BY PHOTOGRAPHIC PROCESS

CE CERTIFICAT EST CONFORME AU FASCICULE DE DOCUMENTATION FD X 07-012

THIS CERTIFICATE IS CONFORM TO THE STANDARD FD X 07-012

Certificat d'étalonnage N° CE-DTE-L-25-PVE-91006
Calibration certificate n°

IDENTIFICATION :
IDENTIFICATION

	Vibromètre *Vibration meter*
Constructeur : *Manufacturer*	01dB
Type : *Type*	ORION
Numéro de série : *Serial number*	10229

PROGRAMME D'ETALONNAGE :
CALIBRATION PROGRAM

Ce système a été étalonné sur les caractéristiques suivantes :

- Réponse en fréquence

The system has been calibrated on different characteristics:

- *Frequency response*

METHODE D'ETALONNAGE :
CALIBRATION METHOD

Cet équipement a été étalonné dans une salle climatisée à 23°C à +/- 5°C.
This equipment has been calibrated in an air conditioning room at 23°C (+/- 5°C)

CONDITIONS D'ETALONNAGE :
CALIBRATION CONDITIONS

Date de l'étalonnage : *Date of Calibration*	11/02/25
Nom de l'opérateur : *Operator Name*	Maxime Donet
Instruction d'étalonnage : *Calibration instruction*	VMT1002000-INS-050

Température : *Temperature*	(23 ± 5) °C
Taux d'humidité relative : *Relative humidity*	(50 ± 30) %HR

Certificat d'étalonnage N° CE-DTE-L-25-PVE-91006
Calibration certificate n°

MOYENS DE MESURES UTILISES POUR L'ETALONNAGE:
INSTRUMENTS USED FOR CALIBRATION

Désignation	Constructeur	Type	N° de série	N° d'identification
Designation	Manufacturer	Type	Serial number	Identification number
Vibromètre laser	POLYTEC	OFV-5000	155310	APM 5048
Transférometre / Frequency Analyser	Solartron	1250	302721	APM 2043

Tous les moyens de mesure utilisés sont raccordés aux étalons de référence de la société 01dB-Metravib. Les étalons de référence de la société 01dB-Metravib sont raccordés aux étalons nationaux par un étalonnage COFRAC. La liste de ces étalons est disponible sur simple demande auprès du responsable métrologique du laboratoire.

All the measuring instruments are calibrated to the 01dB-Metravib reference standard. 01dB-Metravib reference standard are calibrated to national standard with COFRAC certificate of calibration. The reference standard list is available on simple request to the metrological head of the laboratory.

RESULTATS :
RESULTS

Les incertitudes élargies mentionnées sont celles correspondant à deux incertitudes types (k=2). Les incertitudes types sont calculées en tenant compte des différentes composantes d'incertitudes, étalons de référence, moyens d'étalonnage, conditions d'environnement, contribution de l'instrument étalonné, répétabilité …

Expanded uncertainty of a measurement mentioned correspond of two standard uncertainty (k=2). Standard uncertainty are calculated including different uncertainty components, reference standard, instruments, environmental conditions, calibrated instrument contribution, repeatability

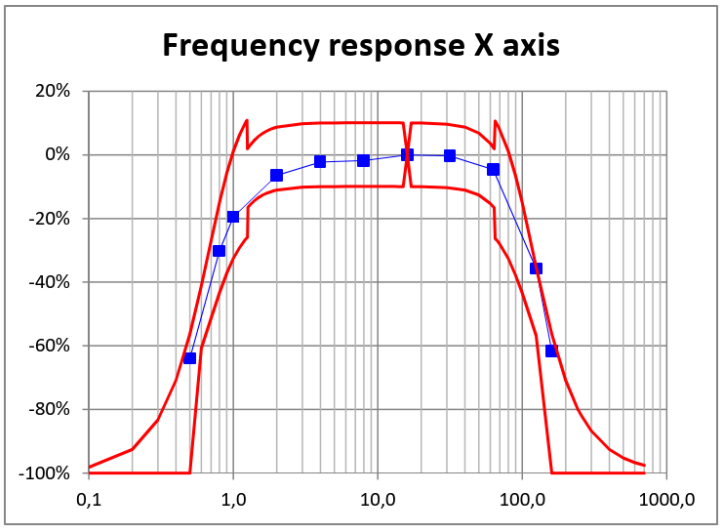
SENSIBILITE DU CAPTEUR INTERNE (MV/G) :
SENSIBILITY OF THE INTERNAL SENSOR (MV/G)

X axis	Y axis	Z axis
515	530	514

Certificat d'étalonnage N° CE-DTE-L-25-PVE-91006
Calibration certificate n°

Frequency response X axis / ORION #10229

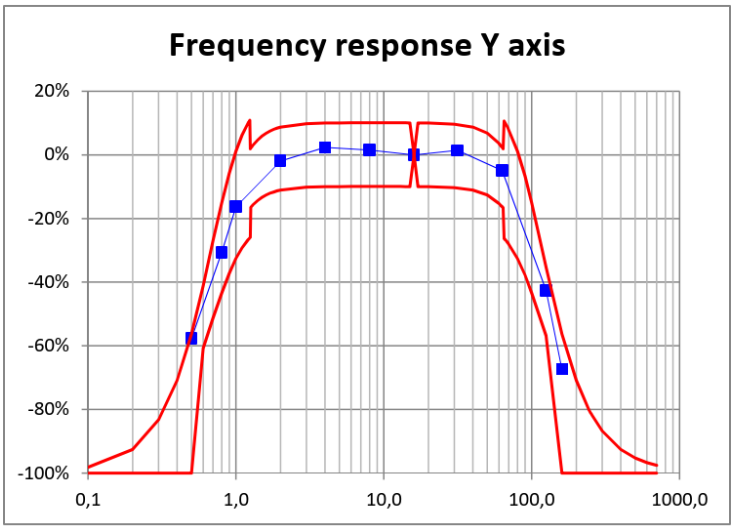
f (Hz)	Ref. Value (mm/s pk)	Mes. Value (PPV mm/s pk)	Deviation X (%)	Deviation X (% rel to 16 Hz)	Lower Tolerance Limit (%)	Upper Tolerance Limit (%)	Uncertainty (%)
0,5	4,05	1,56	-61,6%	-63,9%	-100,0%	-56%	4,0
0,8	3,96	2,94	-25,8%	-30,2%	-43,4%	-15%	4,0
1,0	3,99	3,41	-14,4%	-19,5%	-32,6%	1%	4,0
2,0	10,03	9,98	-0,5%	-6,5%	-11,1%	9%	4,0
4,0	9,96	10,35	4,0%	-2,3%	-10,0%	10%	4,0
8,0	10,02	10,46	4,4%	-1,8%	-9,9%	10%	4,0
16,0	10,00	10,63	6,4%	0,0%	0,0%	0%	4,0
31,5	9,96	10,56	6,0%	-0,3%	-10,3%	10%	4,0
63,0	9,96	10,11	1,5%	-4,6%	-16,3%	2%	4,0
125,0	9,99	6,82	-31,5%	-35,8%	-56,8%	-35%	4,0



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Calibration certificate n°

Frequency response Y axis / ORION #10229

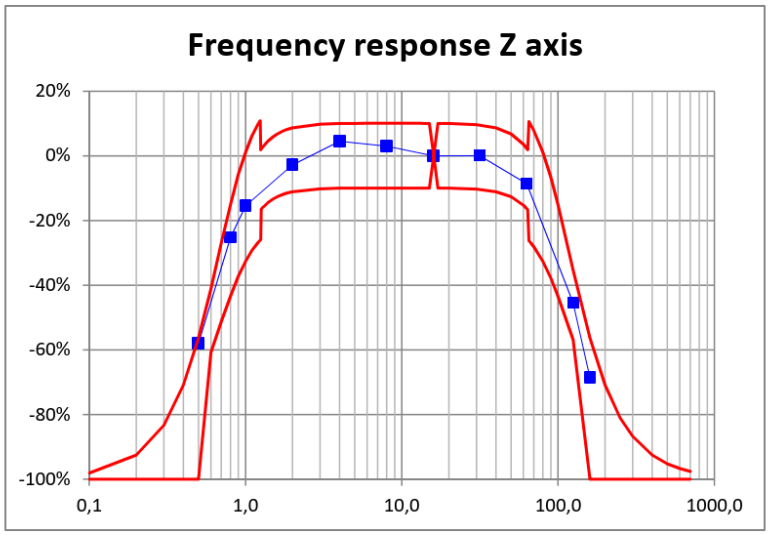
f (Hz)	Ref. Value (mm/s pk)	Mes. Value (PPV mm/s pk)	Deviation X (%)	Deviation X (% rel to 16 Hz)	Lower Tolerance Limit (%)	Upper Tolerance Limit (%)	Uncertainty (%)
0,5	4,00	1,75	-56,2%	-57,7%	-100,0%	-56%	4,0
0,8	4,01	2,88	-28,2%	-30,6%	-43,4%	-15%	4,0
1,0	3,99	3,45	-13,4%	-16,3%	-32,6%	1%	4,0
2,0	10,06	10,21	1,5%	-1,9%	-11,1%	9%	4,0
4,0	9,82	10,40	5,9%	2,3%	-10,0%	10%	4,0
8,0	9,96	10,46	5,0%	1,5%	-9,9%	10%	4,0
16,0	9,99	10,34	3,5%	0,0%	0,0%	0%	4,0
31,5	9,99	10,48	4,9%	1,4%	-10,3%	10%	4,0
63,0	10,02	9,86	-1,3%	-4,9%	-16,3%	2%	4,0
125,0	10,47	6,22	-37,9%	-42,6%	-56,8%	-35%	4,0



Certificat d'étalonnage N° CE-DTE-L-25-PVE-91006
Calibration certificate n°

Frequency response Z axis / ORION #10229

f (Hz)	Ref. Value (mm/s pk)	Mes. Value (PPV mm/s pk)	Deviation X (%)	Deviation X (% rel to 16 Hz)	Lower Tolerance Limit (%)	Upper Tolerance Limit (%)	Uncertainty (%)
0,5	3,99	1,72	-56,9%	-58,0%	-100,0%	-56%	4,0
0,8	4,08	3,13	-23,4%	-25,2%	-43,4%	-15%	4,0
1,0	3,96	3,43	-13,4%	-15,5%	-32,6%	1%	4,0
2,0	10,86	10,81	-0,4%	-2,8%	-11,1%	9%	4,0
4,0	9,85	10,54	7,1%	4,5%	-10,0%	10%	4,0
8,0	9,92	10,47	5,5%	3,0%	-9,9%	10%	4,0
16,0	10,00	10,24	2,5%	0,0%	0,0%	0%	4,0
31,5	9,98	10,23	2,5%	0,1%	-10,3%	10%	4,0
63,0	10,03	9,39	-5,9%	-8,6%	-16,3%	2%	4,0
125,0	9,85	5,51	-45,1%	-45,4%	-56,8%	-35%	4,0



Fin du certificat d'étalonnage. End of calibration certificate