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BRIEF FOR CONSULTANCY:

To conduct a noise impact assessment in relation to the proposed residential development and to offer advice as necessary to facilitate compliance with the relevant standards and guidelines.

Noise Impact Assessment Proposed Residential Development 131 Minerva Street Glasgow G3 8LE

Technical Report No. R-9081A-LH1-ST
28th September 2021

PREPARED FOR:

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1.0 Introduction

- 1.1 We were instructed by Andrew Duncan on behalf of Nevis Properties to undertake a noise impact assessment for the proposed residential development at 131 Minerva Street, Glasgow and to offer any acoustical advice necessary to facilitate compliance with the acoustic planning guidelines.
- 1.2 The project drawings indicate that the development is a 10 storey flatted development incorporating a ground floor car park and 1st floor external amenity area. Appendix A details the proposed layout of the residential scheme.
- 1.3 The primary noise sources affecting the site is from road traffic and rail traffic to the south of the development site. Road traffic noise is predominately from the A814 to the south, it was noted during the site visit that road traffic pass by from the surrounding localised road networks were minimal. The rail line to the south is set within a deep cutting below the local road networks. Appendix B of this report shows the site location and primary noise source locations.

2.0 Relevant planning guidance

- 2.1 Planning Conditions relating to noise are intended to ensure there is no loss of amenity for residents due to excess noise from any external source. Reduction of residential amenity by noise is considered, during night-time hours, as the potential for sleep disturbance and, during daytime hours, as annoyance and disturbance from any task requiring concentration.
- 2.2 Current guidance for local authorities with regard to noise affecting planning matters is given in the Scottish Government's PAN 1/2011 "*Planning and Noise*" document, with further details on the assessment of noise provided in its associated Technical Advice Note (TAN): 'Assessment of Noise'.
- 2.3 Paragraph 15 of PAN 1/2011 gives the following advice:
- 2.4 Issues which may be relevant when considering noise in relation to a development proposal include:
- *Type of development and likelihood of significant noise impact,*
 - *Sensitivity of location (e.g. existing land uses, NMA, Quiet Area),*
 - *Existing noise level and likely change in noise levels,*
 - *Character (tonal, impulsivity etc), duration, frequency of any repetition and time of day of noise that is likely to be generated, and*
 - *Absolute level and possible dose-response relationships e.g. health effects if robust data available.*
- 2.5 Paragraph 19 recommends that in order to assist in the preparation and consideration of planning applications, Noise Impact Assessments may be requested by the planning authority. Noise Impact Assessments are to "*demonstrate whether any significant adverse noise impacts are likely to occur and if so, identify what effective measures could reduce, control and mitigate the noise impact.*"

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- 2.1 Paragraph 23 states “*Road traffic noise impact assessments should take account of level, potential vibration, disturbance and variation in noise levels throughout the day, the pattern of vehicle movements and the configuration of the road system*”.
- 2.2 Other than the example assessments, PAN 1/2011 and TAN do not suggest criteria to employ for the noise assessments, but rather delegate this task to the planning authorities.
- 2.3 We would consider the range of acoustic standards indicated by BS 8233:2014 ‘Sound Insulation and noise reduction for buildings’ appropriate for a residential assessment; as outlined in Table 1, relative to urban noise including road and rail traffic noise.

Table 1. BS 8233:2014 Indoor ambient noise criteria (dB re 2 x 10⁻⁵ Pa)			
Activity	Typical situation	Assessment period	
		07:00 to 23:00	23:00 to 07:00
Resting	Living room	35	-
Dining	Dining rooms/area	40	-
Sleeping (inc. daytime resting)	Bedroom	35	30

- 2.4 For single sound events, the sound pressure levels inside the bedrooms at night should not regularly (more than 10-15 times per night) exceed L_{Amax} 45 dB. In determining the significance of any noise events above this level, the consideration should be given to the number of events and the maximum sound pressure level as a small number of events with high maximum sound pressure level may affect sleep.

3.0 Measurement procedure

- 3.1 Unattended noise measurements were undertaken between the Wednesday 1st and Thursday 2nd September 2021 by Scott McCall and Richard Mackenzie to establish representative road and rail traffic noise levels at the proposed site. The sound level meter was logging 100ms data alongside audio recording for identification of noise sources.
- 3.2 The meteorological conditions during the noise survey were within the generally acceptable parameters. During the measurements the wind speed was under 5m/s, with the temperature range approximately 8 - 23°C.
- 3.3 The microphone was positioned at a height of 4m and 2m away from the existing West Greenhill Place facade in relation to the proposed development site. This measurement position was chosen as it is seen to represent the most onerous façade location in relation to the south boundary of the development site.
- 3.4 All measurement instruments were calibrated prior to the measurement periods according to manufacturer's instructions. All instruments comply with Class 1 status. No deviation of the calibration levels was recorded. The equipment used in the measurements is detailed in Appendix C.
- 3.5 Figure 1 below shows the survey location for the road and rail noise measurements.

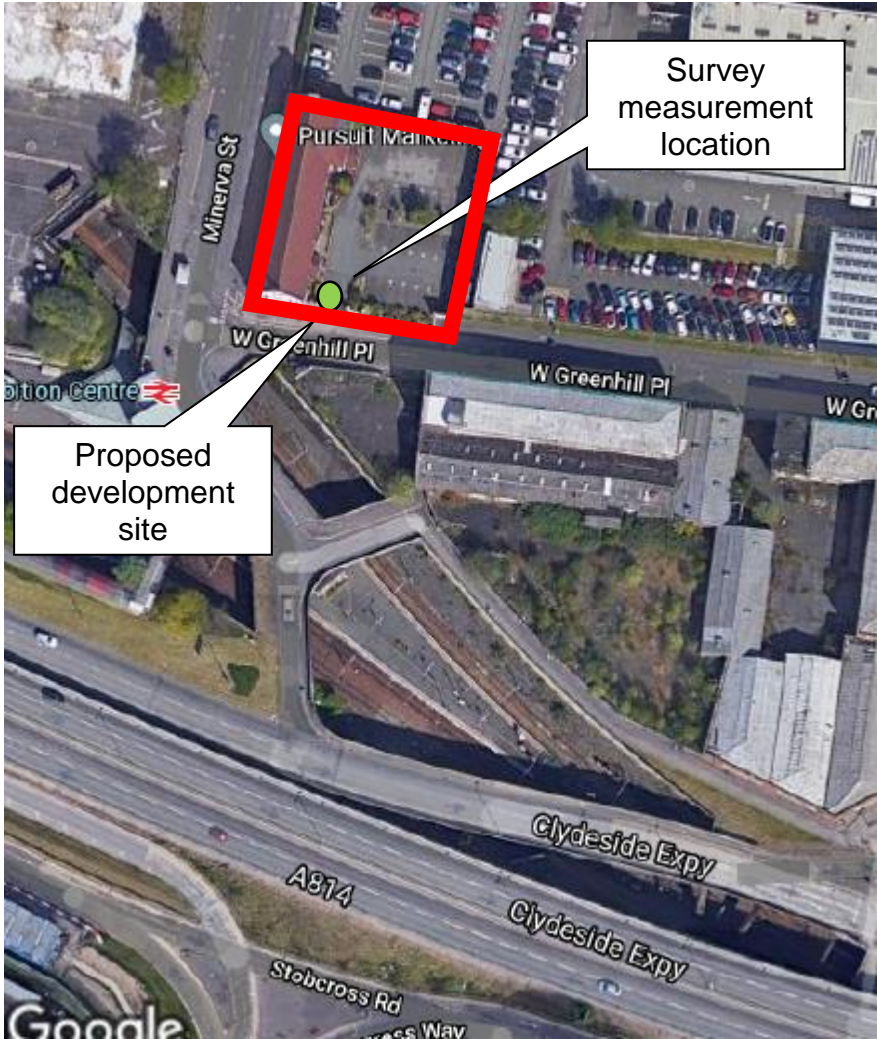


Figure 1: Location Plan and Measurement Position



4.0 Measurement Results

4.1 The summary measurement results are shown in Tables 2 to 4, presented as the 'A' weighted equivalent continuous sound level, L_{Aeq} (a logarithmic average over the measurement duration).

Table 2. Measured daytime south facade noise levels West Greenhill Place (dB re 2×10^{-5} Pa)				
Measurement Period	Start (hh:mm)	Duration (hh:mm)	$L_{Aeq,T}$	L_{AFmax}
01/09/2021 & 02/09/2021	12:00	16:00	62.3	89.7

Table 3. Measured night-time south facade noise levels West Greenhill Place (dB re 2×10^{-5} Pa)				
Measurement period	Start (hh:mm)	Duration (hh:mm)	$L_{Aeq,T}$	L_{AFmax}
01/09/2021 & 02/09/2021	23:00	08:00	57.4	81.4

5.0 Noise Impact Assessment

5.1 Internal Day and Night-time Noise Levels

5.2 The results presented in Tables 2 and 3 represent the full 16hr daytime period and the full 8hr night-time period received noise levels at the nearest façade in relation to the noise sources.

5.3 The measured L_{AFmax} levels are dominated by train passes the 10th highest recorded maximum noise level for the night-time period was in the order of L_{AFmax} 72 dB. A correction of +10dB will be applied to the night-time L_{AFmax} to account for the partial screening afforded to rail traffic noise as the rail line is set within a deep cutting. It is seen that proposed flatted dwellings on the upper levels of the development are likely to have a direct line of sight to the rail track below and will therefore not benefit from the partial screening afforded by the rail cutting.

5.4 No correction has been applied to the L_{Aeq} as the measured levels in this parameter are dominated by road traffic noise, which was not shielded from the measurement position.

5.5 Internal Day and Night-time Assessment

5.6 The assessment of received internal day and night-time levels to the proposed development can be obtained by taking a reduction of 15dB for a partially open window for ventilation. No correction has been made for distance attenuation as the measurement location was taken as the nearest façade build line. The assessment of received internal levels is set out in Table 4 below.



Table 4: Prediction of Received Internal Noise at South Boundary Nearest Façade, Open Window (dB re 2 x 10⁻⁵ Pa)		
	L_{Aeq,T}	L_{AFmax}
Internal Daytime		
16hr Noise Level	62.3	N/A
Open Window Reduction	-15.0	-
Predicted Internal Level	47.3	-
Target Level	35.0	-
Difference Above/Below Criteria	+12.3	-
Internal Night time		
8hr Noise Level	57.4	72.3
Correction for shielding at measurement position	-	+10
Open window Reduction	-15.0	-15.0
Predicted Internal Level	42.4	67.3
Target level	30	45.0
Difference Above/Below Criteria	+12.4	+22.3

5.7 With reference to Table 4 above it can be seen that received internal noise levels would exceed the nominated BS8233:2014 criteria levels for both the day and night-time periods. Therefore mitigation measures will be required to meet BS8233:2014 criteria.

6.0 Mitigation

- 6.1 Internal noise levels during both the daytime and night-time periods from road and rail traffic noise at the proposed development are predicted to exceed the nominated BS8233 criteria. Mitigation of received noise levels will therefore be required so that criteria levels are likely to be achieved.
- 6.2 Consideration has been given to reducing the impact of road and rail noise by increasing the distance from the noise source to the receiver. However it is seen that significant distances will be required to reduce noise levels adequately enough to meet criteria levels, which in practice would be impracticable for the development site use.
- 6.3 Mitigation measures to reduce the impact of road and rail noise sources can be achieved with the use of appropriately designed façade insulation i.e. glazing and ventilation standards.
- 6.4 In order to predict internal noise levels during the day and night-time periods it is assumed that the performance of the building façade will be dictated by the weakest element, which is considered to be the glazing unit. We have therefore taken a worst case scenario where no additional attenuation is provided by the composite elements of the façade (e.g. walls).
- 6.5 It is recommended that a glazing specification with a minimum performance of $38R_w + C_{tr}$ dB is used to reduce the impact of road and rail traffic noise internally. Table 5 details the anticipated internal noise levels from road and rail traffic at the nearest South Boundary facade with mitigation measures in place.



Table 5: Prediction of Received Internal Noise at South Boundary Nearest Façade with Mitigation (dB re 2 x 10⁻⁵ Pa)		
	L_{Aeq,T}	L_{Amax}
Internal Daytime		
16hr Noise Level	62.3	N/A
Glazing Insulation 38 R _w +C _{tr} dB	-38.0	-
Predicted Internal Level	24.3	-
Target Level	35.0	-
Difference Above/Below Criteria	-10.7	-
Internal Night time		
8hr Noise Level	57.4	72.3
Correction for shielding at measurement position	-	+10
Glazing Insulation 38 R _w +C _{tr} dB	-38.0	-38.0
Predicted Internal Level	19.4	44.3
Target level	30	45.0
Difference Above/Below Criteria	-10.6	-0.7

- 6.6 It can be seen from Table 5 above that the nominated BS8233 criteria for internal day and night-time periods are likely to be met when mitigation measures are in place.
- 6.7 The glazing specification is dictated by the maximum noise levels at night. Facades will require a glazing unit which provides a minimum R_w+C_{tr} of 38dB in order to offer compliance with the nominated criteria.
- 6.8 Any façade ventilator fitted to the windows overlooking the road should be specified with an acoustic performance of D_{n,e,w}+C_{tr} ≥ 44 dB when in the open position.
- 6.9 If multiple ventilator units are installed within the same room, the individual acoustic ventilator performance will need to be increased by a factor of 10 x log₁₀(n), where n is the number of vents installed per room.

7.0 Conclusion

- 7.1 We were instructed by Andrew Duncan on behalf of Nevis Properties to undertake a noise impact assessment for the proposed residential development at 131 Minerva Street, Glasgow and to offer any acoustical advice necessary to facilitate compliance with the acoustic planning guidelines.
- 7.2 Measurement of road and rail traffic noise has been undertaken at a location deemed representative of the nearest proposed building facade.
- 7.3 In order to meet the nominated BS8233:2014 internal target criteria for the development, recommendations have been given for the provision of suitable glazing and ventilation standards.
- 7.4 Less onerous glazing and ventilation performances will be required to windows that either face away from or are at a greater distance from the road and rail noise sources. A review of the glazing and ventilation requirements for the whole scheme can be provided once subsequent detailed design project information is available.

Prepared by:

Approved by:

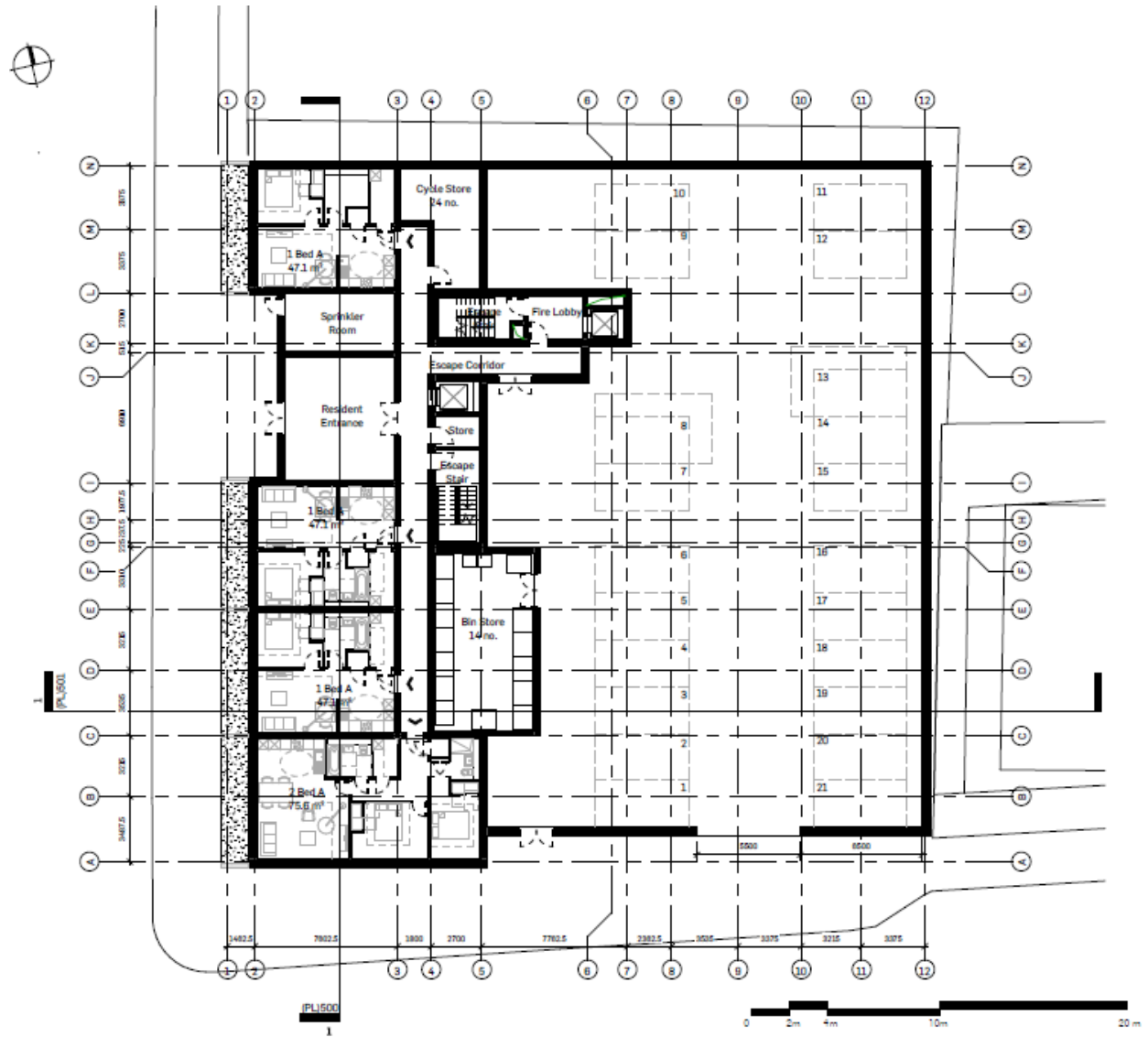
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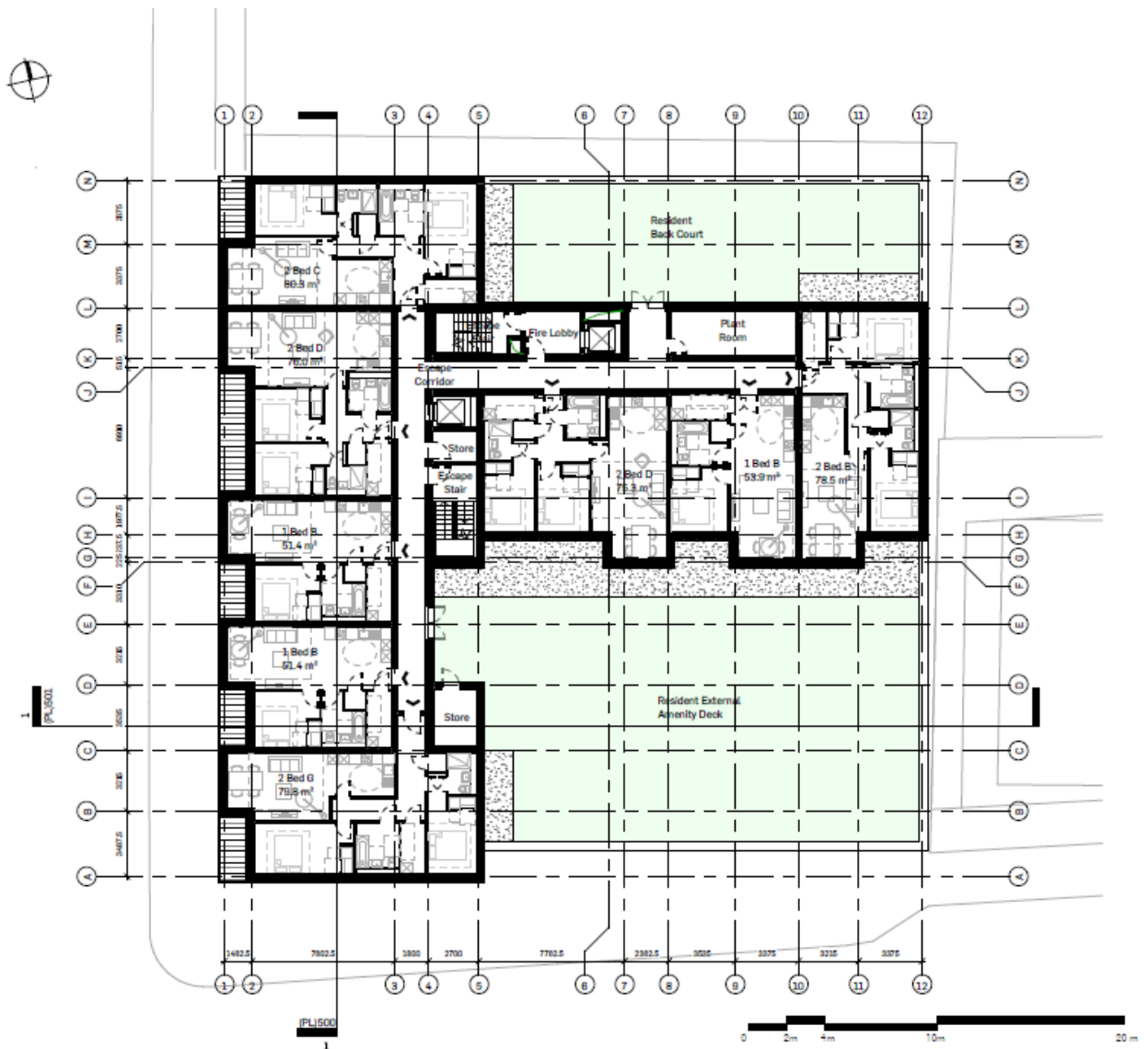
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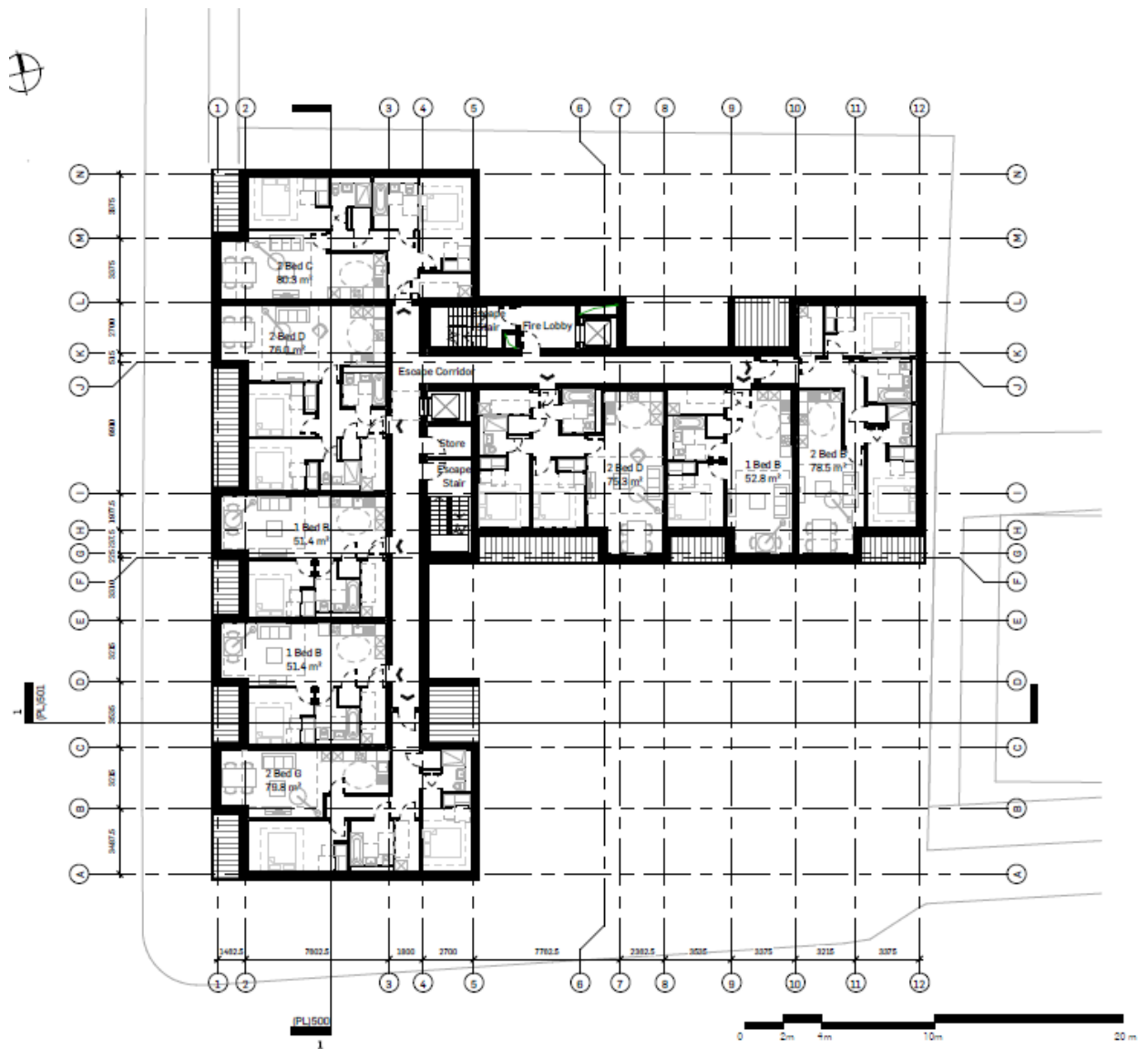
Appendix A: Proposed Development Layout Plans



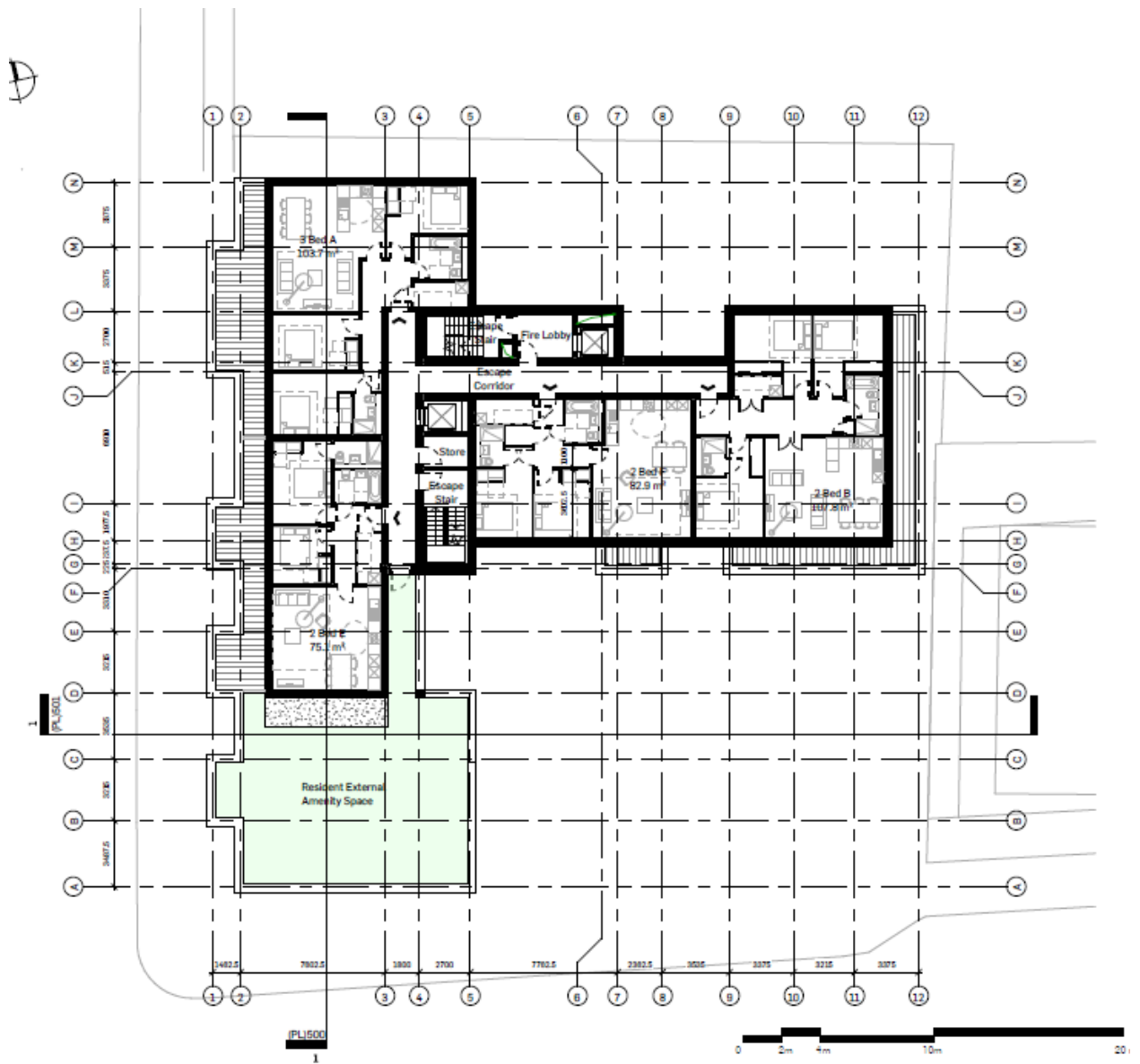
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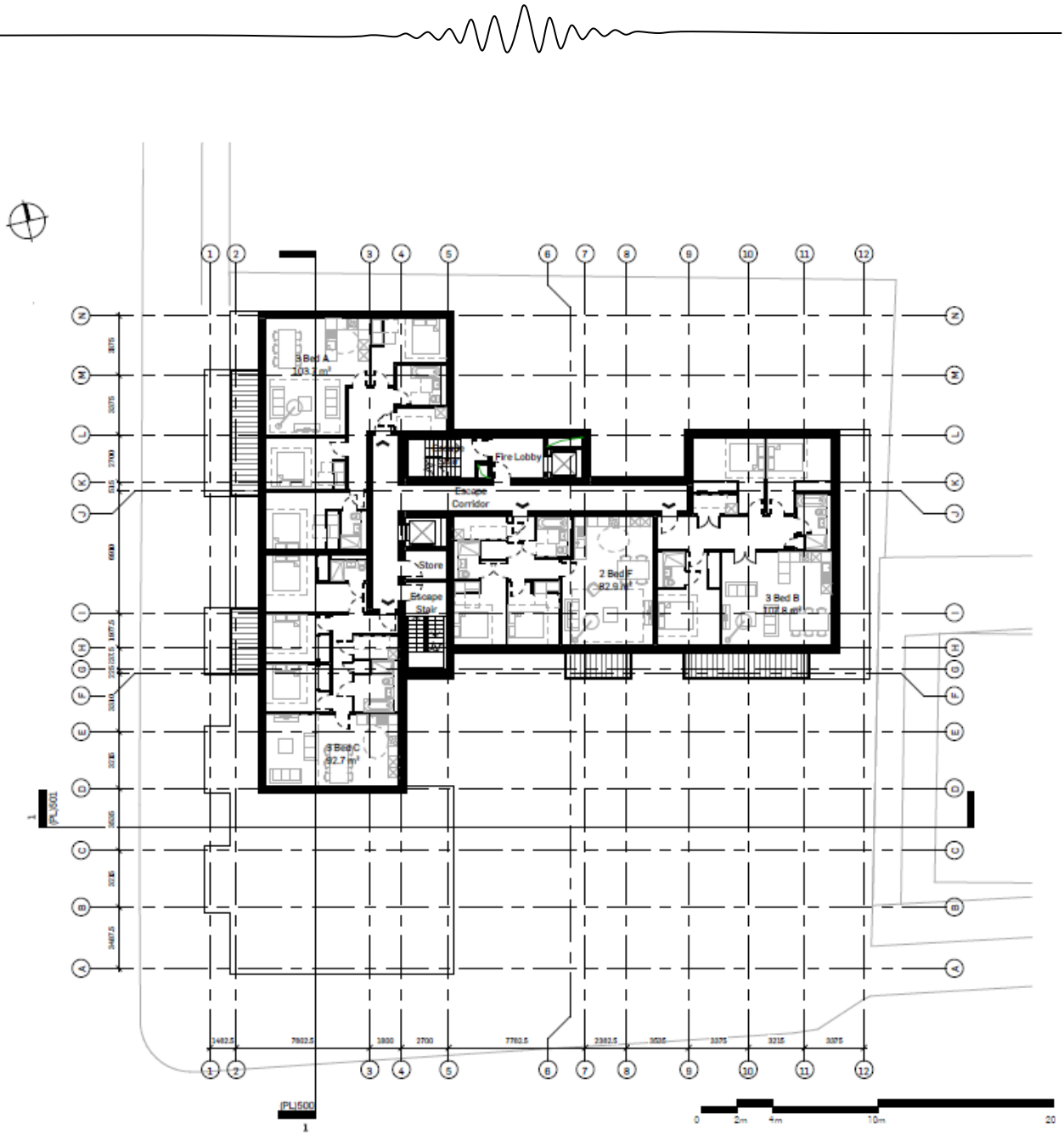
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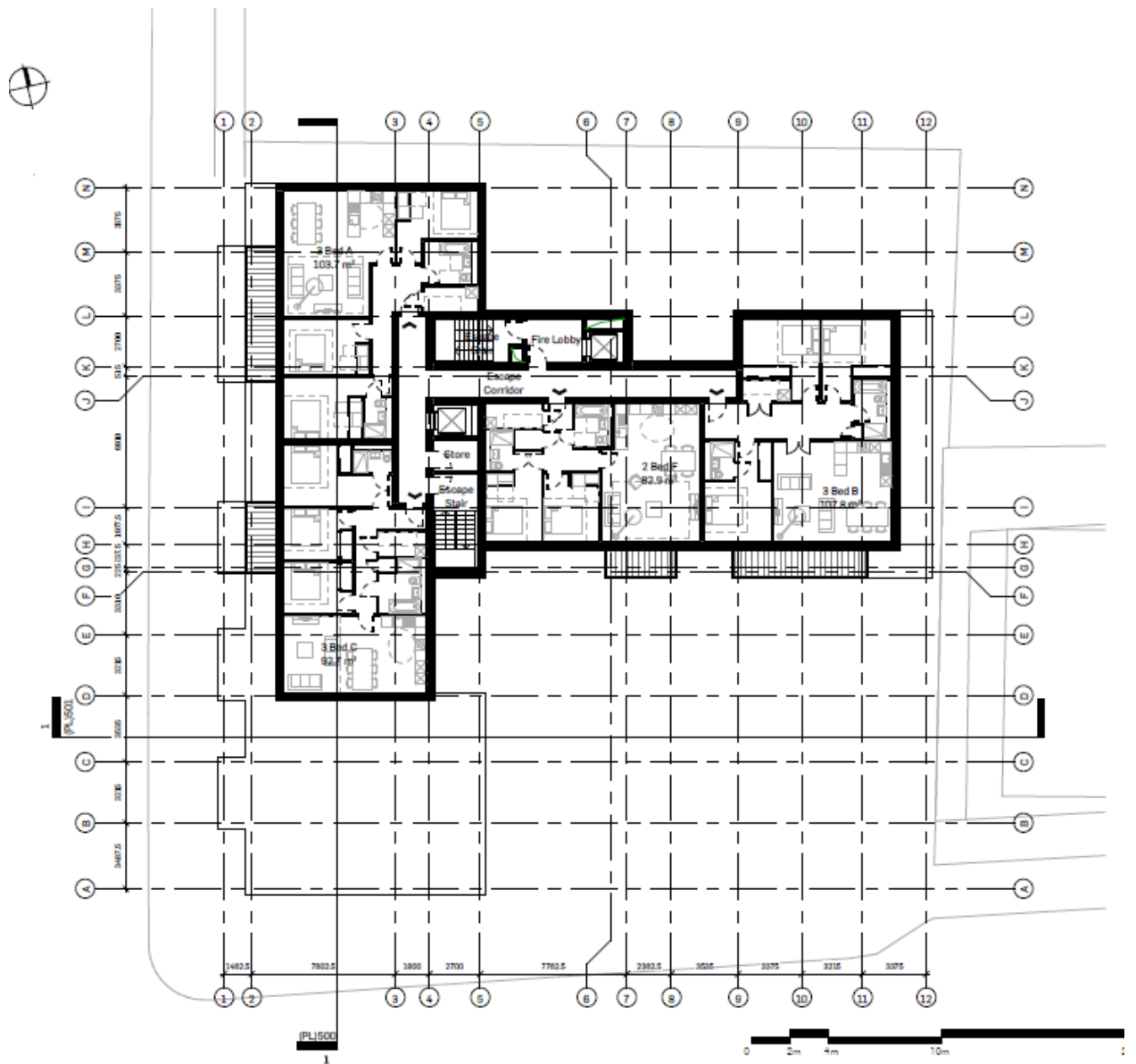
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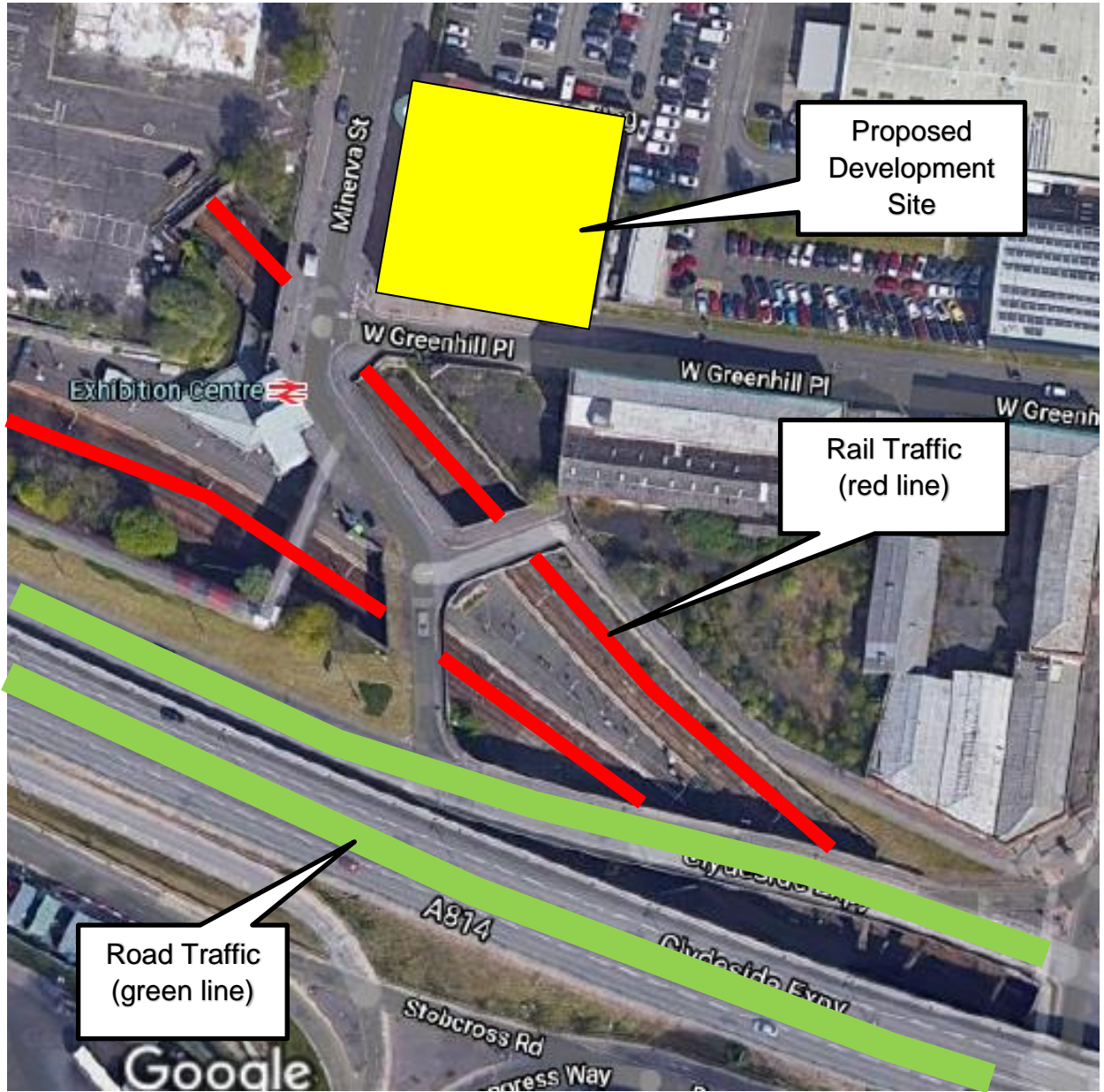


Level 08



Level 09

Appendix B: Noise Source Locations



Appendix C: Noise Instrumentation

Equipment	Serial No.
Rion Sound Level Meter Type NL-52 running Rion's programs NX-42EX Version 1.3, NX-42WR Version 1.2 and NX-42RT Version 1.2	00142575
RION UC-59 1/2" Prepolarized Free-field Microphone	05994
Brüel & Kjær Sound Level Calibrator Type 4231	1685303

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